REPORT ON THE DEVELOPMENT OF THE MANNED ORBITAL RESEARCH LABORATORY (MORL) SYSTEM UTILIZATION POTENTIAL

TASK AREA II INTEGRATED MISSION DEVELOPMENT PLAN



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REPORT ON THE DEVELOPMENT OF THE MANNED ORBITAL RESEARCH LABORATORY (MORL) SYSTEM UTILIZATION POTENTIAL

Task Area II Integrated Mission Development Plan

BOOK 2

\$M-48811 OCTOBER 1965

PREPARED BY N. KALLAY
BRANCH CHIEF
SYSTEMS ENGINEERING

APPROVED BY_

C. E. STARNS PROGRAM MANAGER

SUBMITTED BY
DOUGLAS AIRCRAFT COMPANY, INC.

PRESENTED TO

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
CONTRACT NO. NAS1-3612

APPROVED BY

R. J. GUNKEL

DIRECTOR, ADVANCED MANNED SPACECRAFT SYSTEMS

The Manned Orbital Research Laboratory (MORL) is a versatile facility for experimental research which provides for:

- Simultaneous development of space flight technology and man's capability to function effectively under the combined stresses of the space environment for long periods of time.
- Intelligent selectivity in the mode of acquisition, collation, and transmission of data for subsequent detailed scientific analyses.
- Continual celestial and terrestrial observations.

Future application potential includes use of the MORL as a basic, independent module, which, in combination with the Saturn Launch Vehicles currently planned for the NASA inventory, is responsive to a broad range of advanced mission requirements.

The laboratory module includes two independently pressurized compartments connected by an airlock. The larger compartment comprises the following functional spaces:

- A Control Deck from which laboratory operations and a major portion of the experiment program will be conducted.
- An Internal Centrifuge in which members of the flight crew will perform re-entry simulation, undergo physical condition testing, and which may be useful for therapy, if required.
- The Flight Crew Quarters, which include sleeping, eating, recreation, hygiene, and liquids laboratory facilities.

The smaller compartment is a Hangar/Test Area which is used for logistics spacecraft maintenance, cargo transfer, experimentation, satellite check-out, and flight crew habitation in a deferred-emergency mode of operation.

The logistics vehicle is composed of the following elements:

- A Logistics Spacecraft which generally corresponds to the geometric envelope of the Apollo Command and Service Modules and which includes an Apollo Spacecraft with launch escape system and a service pack for rendezvous and re-entry maneuver propulsion; and a Multi-Mission Module for either cargo, experiments, laboratory facility modifications, or a spacecraft excursion propulsion system.
- A Saturn IB Launch Vehicle.

Integration of this Logistics System with MORL ensures the flexibility and growth potential required for continued utility of the laboratory during a dynamic experiment program.

In addition to the requirements imposed by the experiment program, system design parameters must reflect operational requirements for each phase of the mission to ensure:

- Functional adequacy of the laboratory.
- Maximum utilization of available facilities.
- Identification of important parameters for consideration in future planning of operations support.

For this reason, a concept of operations was developed simultaneously with development of the MORL system.





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INTRODUCTION

This document presents Application Plan Task Descriptions No. 1 through 673. The remainder of the descriptions is presented in Book 3.

Douglas Aircraft Company, Inc., Report No. MORL 65-1, MORL Applications Plan for Oceanography and Meteorology, dated August 1965, identifies tasks to be accomplished on board a manned orbiting research laboratory. Each task shown on the plan is coded by reference number to Task Description Sheets contained in these documents. A copy of this plan may be obtained upon request from the MORL Studies Office at NASA, Langley Research Center.

APPLICATION PLAN TASK DESCRIPTION SHEETS

Each task description includes the following:

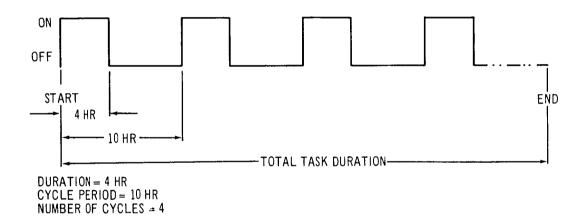
- A brief description of the task to be accomplished on board a manned orbiting research laboratory.
- A brief justification for the task.
- Task parameter sheets listing the time-dependent resources required to perform the task and other data pertinent to a computerized experiment scheduling program. (Task parameter definitions are given below.)

Some tasks have two parameter sheets--one describing the experiment and the other the installation of the task's experimental equipment or instruments. These setup tasks are identified by a three- or four-digit number beginning with 1; e.g., Task No. 101 is the setup for Task No. 1.

Experiment parameters for Application Plan tasks are defined as follows:

- 1. Task Number--Identifies the Application Plan task for which the following data are required as an input to a laboratory simulation program (which includes experiment scheduling).
- Interruptible -- If a task is interrupted because of a failure, this input defines whether the task must be started all over again or whether it can be resumed from the point at which it was stopped.

- 3. Duration (On-time/cycle) -- States the time required to complete the active portion of the task (see following example).
- 4. Cycle Period--Gives the time from the beginning of one cycle to the start of the next (see following example). Cycle Period equals Duration for noncyclic tasks.
- 5. Number of Cycles Required--States the total number of cycles required to complete the task (see the following example).



- 6. Predecessor Task Number--Identifies the task whose completion leads directly to the subject experiment.
- 7. Successor Task Number and Initial Lag Time--Identifies those tasks that are immediate successors to the task being defined and lists the minimum required time delay between the end of the subject task and the first attempt to start its immediate successors.
- 8. Manpower--States the average manpower required during each cycle duration. Increments of whole men are used; that is, I man for 0.1 hour, rather than 0.1 man for I hour (a situation that could arise from only partial attention being required by a test over a long period).

The total hours that men are required for each cycle must be less than, or equal to, cycle duration. If the hours required per man each cycle are less than the cycle's duration, time is given from the start of the cycle to when men are first required. This is explained in the following example:

Duration = 4 hours

Manpower = 2 men--2.5 hours

1.5 hours from start of cycle

This input says that two men are required for the last 2 1/2 hours of each 4-hour cycle.

9. Electrical Power--States the average electrical power required for each cycle duration.

If electrical power is required for less than the cycle's duration, then the time is given from the start of the cycle to when power is first required.

- 10. Shipping Weight--Lists the equipment weight (including a crating allowance) for the task.
- 11. Shipping Volume--Lists the equipment volume in its "as shipped" condition. The external dimensions of the shipping crates are used.

The following briefly describe tasks to be accomplished on board a manned orbiting research laboratory.

TASK NO. 1 TITLE Lubrication of Bearings

LEVEL Applied Research for Design Data

DESCRIPTION

Representative bearing designs, typical of those to be employed, and pretested lubricants will be installed in the external environment and operated with appropriate loads. The bearings will be periodically inspected and tested for torque changes caused by unsatisfactory lubrication. The exposure time should be equivalent to the expected operating time; bearing life should be determined.

JUSTIFICATION

Many instrument systems will require external, movable components (radar antennas, television and camera zoom lenses, etc.). Therefore, the problems of lubricating bearings in the orbital environment should be evaluated.

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TASK NO. 3 TITLE Antenna-MORL Dynamic Interaction in Zero g

LEVEL Applied Research for Design Data

DESCRIPTION

An external antenna will be operated after installation on the laboratory. Angles between the antenna boresight and the laboratory stable platform will be continuously measured while the antenna is operated in all scan modes, both automatic and manual. Data will be compared to determine effects of the antenna-MORL interaction on antenna pointing accuracy.

Because reaction torques will be inducted in the laboratory as a result of the antenna slewing requirements, it will be necessary to evaluate requirements for maintaining the dynamic equilibrium of the laboratory.

JUSTIFICATION

Sea state and tsunami data require the measurement of range from the laboratory to the ocean surface. The accuracy of these measurements is influenced by the stability of the laboratory, which is in turn influenced by induced torques caused by slewed antennas. A task is therefore required to evaluate the dynamic interaction of the antenna with the vehicle in a zero-g environment.

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TASK NO. 4 TITLE Plastic Materials Ultraviolet Sensitivity

LEVEL Applied Research for Design Data

DESCRIPTION

Candidate plastic materials employed as part of the radar radiation subsystem will be exposed to ultraviolet radiation encountered during MORL operation. These materials will be periodically inspected, and the performance of the component will be measured to determine deterioration under conditions of prolonged exposure.

JUSTIFICATION

Since the antenna system will be located outside the laboratory, the influence of the ultraviolet radiation from the sun on the performance of the antenna feed system should be evaluated.

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INTERRUPTION CYCLE PERIOD PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE _ IOD (HE OR TASK TASK LAG	SK NO. 2 TIME	Yes 720 104 01, 0	HR FROM START OF CYCLE 0	hr; 18, 0 1	DURATION (HR) NO. OF CYCLES POWER 1 O HR FROM ST GHT O NAME	3 12 ART OF CY LB	. W1 CLE	(ON TIME/CYCLE)
INTERRUPTION CYCLE PERIOD PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE _ IOD (HE OR TASK TASK LAG	SK NO. 2 TIME	Yes 720 104 01, 0	HR FROM START OF CYCLE 0	hr; 18, 0 1	DURATION (HR) NO. OF CYCLES POWER 1 O HR FROM ST GHT O NAME	3 12 ART OF CY LB	. W1 CLE	(ON TIME/CYCLE)

TASK NO. 5 TITLE Special Tools for Assembly of External Components in Zero g

LEVEL Applied Research for Design Data

DESCRIPTION

Special tools will be evaluated by operational use aboard MORL. Sample tools will be employed for each application and their utility will be evaluated. Prototype tools for which potential needs exist will be used to assemble, install, and replace parts, and to disassemble and repair antenna subsystems in the external environment.

JUSTIFICATION

This task is associated with the problems which occur in the use of tools in a zero g environment. It is anticipated that platform alignment and possible antenna system repair and adjustment by laboratory personnel will be required. Therefore, a task has been specified for evaluating the special tools required for accomplishing these functions.

NU	5		TITLE	Special Tools for Assemb	ly of External Co	mponents
INTERRUPT	IBLE	Yes	<u>,</u>	DURATION (HR)	4	(ON TIME/CYCLE)
CYCLE PER	IOD (HR)	4		NO. OF CYCLES	6	
PREDECESS SUCCESSOR		-		_		
AND INITIAL			, 0 hr; 202,	0 hr		
	1	I	UD CDOM CTART	1		
NO. OF MEN	SKILL ID	HR/CYCLE	HR FROM START OF CYCLE			
1	60	4	0	ELECTRICAL POWER50	W4	HR/CYCLE
1	72	4	0	O HR FROM START		
<u></u>			 	SHIPPING WEIGHT 10 LB	SHIPPING VOLUME	0, 25_ FT ³
EQUIPMENT		D		NAME		1
REQUIRED		- Spe	cial Tools			1
		- Tap	e Re c order	and Movie Camera		
		1				1

TASK NO. 6 TITLE Particulate Impingement on Lenses

LEVEL Applied Research for Design Data

DESCRIPTION

Sample lenses will be exposed to impingement by particulate matter in MORL's external environment. The lenses will be examined periodically for reduced resolution by exposing a film to a standard test target through the lenses being tested.

JUSTIFICATION

Optical lenses will be used in a wide variety of instruments, such as cameras; television systems; IR, optical, and UV radiometers; optical driftmeters; and so on. Since these instruments will be used to make precise measurements, lens degradation caused by impingement will be critical and may seriously affect instrument sensitivity and resolution. Therefore, the level of degradation must be predictable.

NO10	16		TITLE	Install Lenses		
INTERRUPTI	BLE Ye	s		DURATION (HR)	4	(ON TIME/CYCLE)
				NO. OF CYCLES		
PREDECESSO	OR TASK N	0. <u>No</u> 1	ne			
SUCCESSOR AND INITIAL	TASK NO. LAG TIME	_6. () hr			
NO. OF MEN	SKILL IDII	IR/CYCLF	HR FROM START			
1	60	4	OF CYCLE O	ELECTRICAL POWER O	w O	HD/CVCI E
1	71	4	0	O HR FROM START OF (IIK/ CTOLE
				SHIPPING WEIGHT LB		0 25 cm ³
				Shirring Weight LB	SHIPPING VULUME	F
EQUIPMENT REQUIRED	ID			NAME		1
NEQUINED			1 T			1
	-	Sam	ple Lenses			
		ł				
			·			J
NO	6		TITLE	Particulate Impinge	ement on Lense	es
				DURATION (HR)		
				NO. OF CYCLES		
PREDECESS						
SUCCESSOR AND INITIAL	TASK NO.	71		340 hr; 123, 0 hr; 138, 0 hr	: 1603. 0 hr: 1	608. 0 hr
AND INITIAL	LAG IIME				, _ 0 - 0 , 0 - 11 _ 1	0 0 111
	1		UD EDOM CTART	1		
NO. OF MEN	SKILL IDI	HR/CYCLE	HR FROM START OF CYCLE			
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1	71	3	0	O HR FROM START OF (
				SHIPPING WEIGHTO LB		0FT
	<u> </u>			Sill i lite we letti EB	SHIFFING VOLUME	See 106)
EQUIPMENT	ID			NAME		7
REQUIRED		Sno	sial Test Es	uipment and Samples	·····	1
	-	Spe	ciai Test Eq	urpment and Samples		
	L	L				

TASK NO. 15 TITLE Film Stability in MORL Environment

LEVEL Applied Research for Design Data

DESCRIPTION

Black and white and color film packs will be exposed under various use conditions to the MORL environment for typical operational periods. Film will be processed after exposure to standard resolution targets periodically, and film degradation will be recorded.

JUSTIFICATION

Film stability in the environment of the orbital laboratory is essential to the success of this measurement procedure; therefore this task has been specified to evaluate any special problems which may occur as a result of film degradation in the radiation and atmospheric environment of the laboratory.

NO. 15	·; ·· ———			TITLE	Instal	<u>l Experime</u>	nt Package	е	
NO. OF MEN SKILL IO HR. CYCLE HR FROM START OF CYCLE SHIPPING WEIGHT D LECTRICAL POWER D D HR/CYCLE D D HR/CYCLE D D D D D D D D D	INTERRUPT	IBLE	Yes		DURA	TION (HR)	3		(ON TIME/CYCLE
NO. OF MEN SKILL ID HR/CYCLE HR FROM START OF CYCLE SHIPPING WEIGHT 15	CYCLE PER	IOD (HR)	3		NO. O	F CYCLES	1		
NO. OF MEN SKILL ID HR/CYCLE HR FROM START OF CYCLE SHIPPING WEIGHT 15 LB SHIPPING VOLUME 0.5 FT	PREDECESS	OR TASK NO.	None						
NO. OF MEN SKILL ID HR/CYCLE HR FROM START OF CYCLE 1	SUCCESSOR AND INITIAL	TASK NO. _ LAG TIME -	15, 0 hr						
1									
1	NO. OF MEN	SKILL ID HR	CYCLE HR FRO	OM START CYCLE					
O				0 E	LECTRICAL POWER	_0	W	0	HR/CYCLE
ID		12	3	0 _	0	HR FROM START	OF CYCLE		
NO 15				S	HIPPING WEIGHT	15 LB	SHIPPIN	G VOLUME	0.5FT
NO.	-	[ID			N A M	-			ו
NO15	REQUIRED		Eiles Essa						-
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NO. OF MEN SKILL ID HR/CYCLE HR FROM START OF CYCLE O O O O O O O O O		L]
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NO. OF MEN SKILL ID HR/CYCLE HR FROM START OF CYCLE O O O O O O O O O									
NO. OF MEN SKILL ID HR/CYCLE HR FROM START OF CYCLE O O O O O O O O O	NO	15		TITLE	Film Stabili	ity in MORL	. Environn	nent	
CYCLE PERIOD (HR) 168									
NO. OF MEN SKILL ID HR/CYCLE			105		DURA	TION (HR)			
NO. OF MEN SKILL ID HR/CYCLE HR FROM START OF CYCLE 1	CYCLE PER						2		(ON TIME/CYCLE
NO. OF MEN SKILL ID HR/CYCLE HR FROM START OF CYCLE 1	PREDECESS	IOD (HR) OR TASK NO.	168				2		(ON TIME/CYCLE
1	PREDECESSOR SUCCESSOR	OD (HR) OR TASK NO. TASK NO.	168 115		NO. 0	F CYCLES	12		(ON TIME/CYCLE
1	PREDECESSOR SUCCESSOR	OD (HR) OR TASK NO. TASK NO.	168 115		NO. 0	F CYCLES	12		(ON TIME/CYCLE
1 72 2 0	PREDECESSOR SUCCESSOR AND INITIAL	OD (HR) OR TASK NO. TASK NO. LAG TIME -	168 115 16, 0 hr		NO. 0	F CYCLES	12		(ON TIME/CYCLE
EQUIPMENT REQUIRED The state of cycle Shipping weight O LB Shipping volume O FT Shipping weight O NAME O See 115) The state of cycle Shipping weight O LB Shipping volume O FT Shipping weight O See 115) The state of cycle O LB Shipping volume O FT Shipping weight O See 115) The state of cycle O LB Shipping volume O FT Shipping weight O See 115) The state of cycle O LB Shipping volume O FT Shipping weight O Shipping weight	PREDECESSOR SUCCESSOR AND INITIAL	OD (HR) OR TASK NO. TASK NO. LAG TIME -	168 115 16, 0 hr	M START	NO. 0	F CYCLES	12		(ON TIME/CYCLE
EQUIPMENT REQUIRED ID NAME 19 Camera	PREDECESSISUCCESSOR AND INITIAL NO. OF MEN	OD (HR)OR TASK NO. TASK NO. LAG TIME -	168 115 16, 0 hr CYCLE HR FROM OF C'	M START YCLE O E	NO. 0	F CYCLES	2 12	0	(ON TIME/CYCLE
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19 Camera	PREDECESSISUCCESSOR AND INITIAL NO. OF MEN	OD (HR)OR TASK NO. TASK NO. LAG TIME -	168 115 16, 0 hr CYCLE HR FROM OF C'	M START YCLE O E	NO. OI LECTRICAL POWER 0	O HR FROM START	2 12 	O G VOLUME	ON TIME / CYCLE HR/CYCLE
	PREDECESSISUCCESSOR AND INITIAL NO. OF MEN	OD (HR)OR TASK NO. TASK NO. LAG TIME - SKILL ID HR 60 72	168 115 16, 0 hr CYCLE HR FROM OF C'	M START YCLE O E	LECTRICAL POWER 0 HIPPING WEIGHT	O LB	2 12 	O G VOLUME	ON TIME / CYCLE HR/CYCLE
- Misceriancous rest Equipment and Film Packs	PREDECESSISUCCESSOR AND INITIAL NO. OF MEN	OD (HR)OR TASK NO. TASK NO. LAG TIME - SKILL ID HR 60 72	168 115 16, 0 hr /CYCLE HR FROM OF C	M START YCLE O SY	LECTRICAL POWER 0 HIPPING WEIGHT	O LB	2 12 	O G VOLUME	ON TIME / CYCLE HR/CYCLE
	PREDECESSISUCCESSOR AND INITIAL NO. OF MEN	OD (HR)OR TASK NO. TASK NO. LAG TIME - SKILL ID HR 60 72	168 115 16, 0 hr CYCLE HR FROM OF CO	M START YCLE 0 SH	LECTRICAL POWER 0 HIPPING WEIGHT	O HR FROM START (O LB	2 12 WW OF CYCLE SHIPPIN	O G VOLUME	ON TIME / CYCLE HR/CYCLE
	PREDECESSISUCCESSOR AND INITIAL NO. OF MEN	OD (HR)OR TASK NO. TASK NO. LAG TIME - SKILL ID HR 60 72	168 115 16, 0 hr CYCLE HR FROM OF CO	M START YCLE 0 SH	LECTRICAL POWER 0 HIPPING WEIGHT	O HR FROM START (O LB	2 12 WW OF CYCLE SHIPPIN	O G VOLUME	ON TIME / CYCLE HR/CYCLE
	PREDECESSISUCCESSOR AND INITIAL NO. OF MEN	OD (HR)OR TASK NO. TASK NO. LAG TIME - SKILL ID HR 60 72	168 115 16, 0 hr CYCLE HR FROM OF CO	M START YCLE 0 SH	LECTRICAL POWER 0 HIPPING WEIGHT	O HR FROM START (O LB	2 12 WW OF CYCLE SHIPPIN	O G VOLUME	ON TIME / CYCLE HR/CYCLE

TASK NO. 16 TITLE Picture Resolution

LEVEL Development Test

DESCRIPTION

Pictures will be taken of known surface targets, and the film will be developed and processed aboard MORL. Measurements will be made to determine the resolution limitations under laboratory and equipment limitations. This task will be performed on the color and black and white film and associated equipment. Photographs will be made of test targets under controlled conditions.

JUSTIFICATION

Photography will be used in a wide variety of applications, for instance, in the following areas:

1. Weather Forecasting

- A. Current boundaries and mass transport of sea water can be monitored by analyzing successive color photographs of dye markers placed in the current streams.
- B. The concentration and distribution of sea surface plant life can be analyzed by monitoring photographs of the color distribution of the sea surface.
- C. Plankton concentration and distribution can be monitored by photographing the bioluminescence of the sea surface.
- D. The distribution of fish stocks possibly can be monitored by comparing successive photographs of schooling species on the surface.

2. Waste Disposal and Pollution

- A. Shallow water bottom contours in both the littoral and neritic zone can be analyzed by photogrammetric analysis of successive photographs.
- B. The sedimentation rate and characteristics of the sea bottom can be analyzed by the use of dyed sand and the analysis of successive photographs.
- C. The character of the interface between fresh water and sea water can be analyzed by comparing successive color photographs.

3. Shipping and Navigation

- A. The characteristics of surface currents that contribute to sea-state determination can be analyzed by monitoring photographs at the position and motion of surface floats acting as current tags.
- B. Submerged objects in shallow water can be photographed with polarized filters for the detection of subsurface hazards to shipping and navigation.

The actual resolution achievable with the equipment available in orbit must be determined because it will be critical to the performance of these tasks.

NO: <u>16</u>			TITLE	Picture Resolution	n		
INTERRUPTI	BLE	Yes		DURATION (HR)	4		(ON TIME/CYCLE)
CYCLE PERI	OD (HR)	168		NO. OF CYCLES	12		
PREDECESSO	OR TASK	NO. <u>15</u>					
SUCCESSOR AND INITIAL	TASK NO.	1234,	0 hr				
		· -			<u>-</u>		
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1	60	2	o	ELECTRICAL POWER100	W	2	HR/CYCLE
1	71	2.	0	HR FROM START OF	CYCLE		
				SHIPPING WEIGHT15 LB	SHIPPING	VOLUME.	<u>0.5</u> FT ³
EQUIPMENT		<u>, </u>					
REQUIRED	-	D		NAME			
	1	9 Car	nera				
	-	Mis	cellaneous 7	Test Equipment and Film Pa	ıcks		
	- 1						

TASK NO.

18

TITLE

Assembly, Maintenance, and Alignment Methods for Microwave Radiometer Antenna

LEVEL

Development Tests

DESCRIPTION

This task requires that the equipment operator conduct experiments to determine the effectiveness with which the receiving antenna of the microwave radiometer can be aligned with respect to the MORL platform.

It requires testing of previously developed techniques for attaching or mounting the antenna system external to the laboratory, testing prescribed techniques for repairing or replacing components of the antenna system, and evaluating the performance of the lubrication methods employed. The task would be performed in accordance with pre-established procedures and for several installation, repair, and evaluation cycles to detect limitations or possible improvements to procedures and/or techniques.

The antenna system will be set up and assembled prior to operation, in accordance with established procedures, which will be evaluated by having trained personnel perform the setup, installation, and checkout aboard MORL.

JUSTIFICATION

12

Microwave Radiometer

Assembly Kit

The accuracy of the relative range measurement is critically dependent on the accuracy with which the antenna subsystem can be aligned relative to the MORL, and, therefore, a task has been identified to measure the accuracy achievable within constraints imposed by the laboratory environment.

NO. <u>18</u>			·	TITLE	Assembly Microway	y, Mainten ve Radiome	ance, and	nd Align enna	ment M	ethods fo	r
PREDECESSOR TASK NO. 1, 3, 4, 21, 502 SUCCESSOR TASK NO. 1, 3, 4, 21, 502 SUCCESSOR TASK NO. 1, 3, 4, 21, 502 AND INITIAL LAG TIME 1236, 0 hr; 1623, 0 hr						. DURATION (HR	S		66		
NO. OF MEN	T	. ID HR		UD EDOM STADT	ELECTRICAL	POWER <u>20</u> D HR FROM GHT 15	M START OF	W			
EQUIPMENT REQUIRED		ID -	Spec	cial Test Eq	uipment	NAME]	

TITLE Microwave and Infrared Radiometer Stability in Orbit TASK NO. 21

Environment

LEVEL Applied Research for Design Data

DESCRIPTION

This task is to be performed on the microwave and infrared radiometers to determine their long-term stability in orbit. The radiometers will be checked periodically against surface targets of known characteristics. A calibration source of known characteristic will be used, and data will be recorded to determine stability over long periods.

JUSTIFICATION

Since the passive IR and microwave radiation from the ocean's surface is useful for collecting data for several applications, a task has been specified for monitoring this radiation. Nimbus and Tiros have experienced problems with the long-term stability of the radiometer equipment. Therefore, a special task has been proposed for evaluating the long-term performance degradation of the proposed radiometers.

NTERRUPTIBL	LE	Υe	s		· · · · · · · · · · · · · · · · · · ·	DURATION (HR)	4		(ON TIME / CYCLE
						NO. OF CYCLES			,
PREDECESSOR									
UCCESSOR TA	ISK N	0.							
ND INITIAL L	AG T	ME :							
NO. OF MEN S	KILL	ID HR/	CYCLE	HR FROM START	ī				
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1	72		4	0		O HR FROM STAF			
						GHT <u>40</u> L			l FT
					J 07111 7 111 4 111 2			TT III TOLOME	
EQUIPMENT REQUIRED		ID	_			NAME		,	
		11	IR I	Radiometer					
		12	Mic	rowave Ra	diometer				
		-	Inst	allation Ki	t				
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		- 1							
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						ve and IR Radi			
						ve and IR Radi _ DURATION(HR) <u>(</u>			
NTERRUPTIB	LE _	(es			· · · · · · · · · · · · · · · · · · ·		0.25		
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NTERRUPTIB CYCLE PERIOI PREDECESSOR	LE _ D(HR RTAS	(es) (NO.	1.5 1			DURATION (HR)(0.25		ON TIME CYCLE
NTERRUPTIB CYCLE PERIOI PREDECESSOR	LE _ D(HR RTAS	(es) (NO.	1.5 1	21		DURATION (HR)(0.25		ON TIME CYCLE
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NTERRUPTIB CYCLE PERIOR PREDECESSOR SUCCESSOR TA AND INITIAL L	LE _ D (HR R TAS ASK N AG T	(es_) (K NO 0 IME ID HR/	1.5 1 8, 0	21 hr; 125, 0 HR FROM STAR	hr; 237, 0	DURATION (HR)(200		(ON TIME CYCLE
NTERRUPTIB CYCLE PERIOR PREDECESSOR TA AND INITIAL L NO. OF MENS	LE _C D (HR R TAS ASK N AG T	(es_) (K NO 0 IME ID HR/	1,5 1 8, 0	hr; 125, 0 HR FROM STAR OF CYCLE	hr; 237, 0	DURATION (HR)(0. 25 200 W _		(ON TIME CYCLE
NTERRUPTIB CYCLE PERIOR PREDECESSOR TA AND INITIAL L NO. OF MENS	LE _C D (HR R TAS ASK N AG T	(es_) (K NO 0 IME ID HR/	1,5 1 8, 0	hr; 125, 0 HR FROM STAR OF CYCLE	hr; 237, 0	DURATION (HR)(NO. OF CYCLES hr POWER20	0. 25 200 W _ RT OF CYCLE	O. 2	ON TIME CYCLE HR/CYCLE
NTERRUPTIB CYCLE PERIOR PREDECESSOR TA AND INITIAL L NO. OF MENS 1	LE _C D (HR R TAS ASK N AG T	(es_) (K NO 0 IME ID HR/	1,5 1 8, 0	hr; 125, 0 HR FROM STAR OF CYCLE	hr; 237, 0	DURATION (HR)(NO. OF CYCLES hr POWERO HR FROM STAI	0. 25 200 W _ RT OF CYCLE	0.2	ON TIME CYCLE HR/CYCLE
NTERRUPTIB CYCLE PERIOD PREDECESSOR TA AND INITIAL L NO. OF MENS	LE _ D (HR R TAS ASK N AG T KILL	(es	1.5 18, 0 CYCLE	21 hr; 125, 0 HR FROM STAR OF CYCLE 0	hr; 237, 0 T ELECTRICAL SHIPPING WE	DURATION (HR)(NO. OF CYCLES hr POWER20 O HR FROM STAI	0. 25 200 W _ RT OF CYCLE	O. 2	ON TIME CYCLE HR/CYCLE
NTERRUPTIB CYCLE PERIOR PREDECESSOR TA AND INITIAL L NO. OF MENS 1	LE _C D (HR R TAS ASK N AG T KILL	(es) (NO 1	1.5 18, 0 CYCLE . 25	hr; 125, 0 HR FROM STAR OF CYCLE 0	hr; 237, 0 T ELECTRICAL SHIPPING WE	DURATION (HR)(NO. OF CYCLES hr POWER20 O HR FROM STAI	0. 25 200 W _ RT OF CYCLE	O. 2	ON TIME CYCLE HR/CYCLE
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TASK NO.

23

TITLE

Bandwidth and Characteristics of Infrared Radiometer

Filters

LEVEL

Development Tests

DESCRIPTION

This task will be performed on various filters for use on IR radiometers. The task will consist of evaluating filtering characteristics tested against known surface-based test targets. Data acquired will be used to determine the filters' performance in the radiometer system.

JUSTIFICATION

IR radiometers will be used for several important surface temperature measurements in oceanography and meteorology. The filters used in this instrument should be evaluated in the operational environment against known targets.

10			TITLE	Install I	R Radio	meter F	ilter Te	st Kit	
INTERRUPTIE	BLE	Yes		DUR	RATION (HR)		4		(ON TIME/CYCLE)
CYCLE PERIO	DD (HR)	4		NO.	OF CYCLES		1		·
		6							
SUCCESSOR T	TASK NO. LAG TIME	23, 0	hr						
					-				
NO. OF MEN	SKILL ID HR		OM START CYCLE						
1	67	4	0 ELE	CTRICAL POWE	R <u>O</u>		_ W	0	HR/CYCLE
1	71	4	0		HR FROM				
			SHIP					VOLUME.	0.2 FT ³
EQUIPMENT		1							
REQUIRED	ID			N A	/ME				
	-	Filter T	est Kit						
NO. <u>23</u>)	Vas	TITLE <u>Ba</u>	ndwidth ar	nd Chara	cteristic	cs of IR	Radio	meter Filter
									(ON TIME/CYCLE)
				NO.	OF CYCLES	1 ()		
SUCCESSOR T		123				···		····	<u> </u>
AND INITIAL		1239	9, 0 hr					·	
									
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$\begin{vmatrix} 1 \\ 1 \end{vmatrix}$. 25	O ELE					0.25	HR/CYCLE
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			SHIP	PING WEIGHT.	0	_ LB	SHIPPING	VOLUME.	FT ³
EQUIPMENT	ID	<u> </u>	·····	N/A	AME			(366	143)
REQUIRED	-10			IVE					
	-	Assorted							
	-	Special 7	rest Equipr	nent					
	111	1							
	11	IR Radio	meter						
		IR Radio	meter						

TASK NO. 25 TITLE Infrared Calibration Reference — Absolute Accuracy Tests

LEVEL Development Tests

DESCRIPTION

This task will be performed on a calibration reference for the IR radiometers. A radiometer requires that a calibrating device be part of the equipment. The stability and associated variations will be measured in the MORL environment. Stability of a calibration source will be determined by periodically measuring the temperature of a known surface target of known temperature. When the measured value is compared to the known value under similar conditions, variations in calibration reference can be determined.

JUSTIFICATION

Since the passive IR and microwave radiation from the ocean's surface is useful for collecting data for several applications, a task has been specified for monitoring this radiation. An implied task is the development and testing of a calibration device for reference in making radiometer measurements.

NÖ. 125				TITLE	Install	IR Calib	ration]	Referenc	e	
INTERRUPTI	BLE _		Yes	5	· · · · · · ·	DURATION (H	R)	4		(ON TIME / CYCL
CYCLE PERI	OD (HF	R) <u>4</u>				NO. OF CYCL	ES	11		
PREDECESSO	R TAS	SK NO.	21							
SUCCESSOR	TASK	NO.		25, 0 hr						
	LAG	I IMIC						. <u>.</u>		
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EQUIPMENT REQUIRED		ID				NAME				
KEGGIKED		-	IR	Calibration	Reference	Kit				
	,									•
NO	25			TITLE	IR Caliba	ation Ref	<u>ference</u>	— Absoli	ite Accu	racy Test
INTERRUPT	BLE .	Y	es	<u></u>		DURATION (H	IR)	0.3		(ON TIME CYCL
CYCLE PERI	OD (H	R)	168			NO. OF CYCL	ES	24		· · · · · · · · · · · · · · · · · · ·
PREDECESS			125				····			
SUCCESSOR AND INITIAL	I ASK LAG	NO. TIME -		1239, 0 hr						
•										
NO. OF MEN	CKII I	INUD	/CVCL E	HR FROM START	Ī					
NO. OF MEN	-			OI CICLE						
1	67	' 0	. 3	0	ELECTRICAL	POWER20)	W	0.3	HR/CYC
						AR FR				
					SHIPPING WEI	GHTO	LB	SHIPF	PING VOLUME (See	0 e 125)
EQUIPMENT		ID				NAME				7
REQUIRED		_	Cal	ibration Ref	erence De	vice				7
		_		cial Test Ed						
		11		Radiometer	1 4 P 1 1 0 1 1 0					
		^ ^	***	.,						
		<u> </u>	L							J

TASK NO. 31 TITLE Environmental Effects and Heat Dissipation — Transponder Satellite

LEVEL Applied Research for Design Data

DESCRIPTION

This task is to be performed on the cooperative satellite system involved in the polarimetric measurements. The transponder and its mounting bracket will be taken through the air lock and mounted by a crew member externally but in such position that it will be exposed to direct sunlight and can be viewed from within the MORL.

Thermistors within the transponder will modulate the reradiated signal from the transponder to provide temperature data over a sufficient operational time period. A small S-band signal generator and tuner-receiver will be used from within the laboratory to activate the transponder and to analyze the received signals to evaluate the environmental effects. The output of the receiver will be viewed on an oscilloscope.

When tests are completed, the crew member will re-exit the MORL, demount the transponder and bracket, and return them to the MORL. The transponder will be disassembled and examined for any defects uncovered during testing or any other evidence of progressive failure.

JUSTIFICATION

Because ocean surface salinity is a useful parameter in oceanographic applications, monitoring surface salinity by examining the rotation in the plane of polarization of an S-band signal reflected from the ocean's surface has been identified as a requirement. This implies a task principally concerned with resolving orbital environmental effects and evaluating heat dissipation requirements associated with the transponder satellite used in the polarimeter system.

NO	31		TITLE	Environmental Effect ponder Satellite	ts and Heat	Dissipation	- Trans-
INTERRUPTI	BLE	Yes		DURATION (HR)	4		(ON TIME/CYCLE)
CYCLE PERI	OD (HR)	4		NO. OF CYCLES	3		
PREDECESSO	OR TASK	NON	one				
SUCCESSOR AND INITIAL	LAG TI). <u>140,</u> ME	0 hr				
NO. OF MEN	SKILLI	DHR/CYC	HR FROM START				
1 1	60 72	4 4	0	ELECTRICAL POWER 200 O HR FROM	START OF CYCLE		HR/CYCLE
				SHIPPING WEIGHT 600			10 FT ³
EQUIPMENT REQUIRED		ID		NAME]
WEGOWED	Γ	- I	ransponder S	atellite			
		- N	Miscellaneous	Test Equipment			

TITLE Boresight and Alignment, Manual as Opposed to Automatic

Target Acquisition - Laser System

LEVEL

Development Tests

DESCRIPTION

This task is performed on laser controls and transmitter radiation optics of monostatic laser; it requires the equipment operator to conduct experiments to determine the effectiveness with which a laser radiation system can be aligned with respect to the MORL platform.

Ease, speed, and stability of the alignment procedure will be evaluated to support the accuracy of measurements and the extent to which hardware design changes may be required.

Laser radiation system adjustments will require that procedures and methods be established, evaluated by having trained personnel make the adjustments under operational conditions. Measurements of the time required to accomplish each step will be recorded.

JUSTIFICATION

Since sea state is a parameter of interest in several applications, a measurement of relative range to the ocean surface from the laboratory has been identified as a requirement for evaluating ocean dynamics. Therefore, a task has been specified for evaluating the interaction of the MORL with the optical subsystem of the monostatic laser radar to establish the accuracy limitations resulting from effects such as mechanical vibration or other unpredictable laboratory motion.

NO	36			TITLE	matic Target Acquisition	, Manual as Oppo n Techniques	sed to Auto-
INTERRUPT	IBLE _		Yes		DURATION (HR)	4	(ON TIME/CYCLE)
					NO. OF CYCLES		
PREDECESS	OR TAS	SK NO.		3			
NO. OF MEN	SKILL	ID HR.	CYCLE	HR FROM START OF CYCLE			
1	66	ŀ	i	0	ELECTRICAL POWER50	w <u>2</u> 2	HR/CYCLE
	72	4		0	HR FROM START		
L					SHIPPING WEIGHT 30 LB	SHIPPING VOLUME	0.5 FT ³
EQUIPMENT REQUIRED	[ID			NAME		7
ne quine s		-		ie Camera er Radiation	and Lights n System and Controls Co	mponents	
	- 1						

TITLE Optimum Baseline — Remote Satellite

LEVEL Development Tests

38

DESCRIPTION

TASK NO.

This task will be performed on the remote satellite for the bistatic laser system, which will be set up and operated against surface targets of known characteristics. Since the bistatic system baseline influences accuracy and resolution, measurements of relative range to the surface target will be conducted for various baseline separations between the laboratory and its transponder (transmitter). Data will be analyzed to select the optimum baseline.

JUSTIFICATION

Since sea state is of interest in several applications, a measurement of relative range to the ocean surface from the laboratory has been identified as a requirement for the derivation of ocean dynamics. A bistatic laser radar may be a means of making these measurements. This requires the determination of baseline for optimizing measurement accuracy.

NO. <u>13</u>	8	<u> </u>		TITLE	Assemb (Lidar)	le Remote S	atellite	for Bis	tatic L	aser System
INTERRUPT	IBLE _		Yes							(ON TIME/CYCLE)
						NO. OF CYCLES				
PREDECESS				•						
SUCCESSOR AND INITIAL	TASK I	10.								
NO. OF MEN	SKILL	IDIF	IR/CYCL F	HR FROM START						
	 	\dashv		OFCTCLE						
1 1	66		4 4	0 0					0	HR/CYCLE
1	67		4	0		HR FROM				3
					SHIPPING WE	IGHT <u>60</u>	LB	SHIPPIN	NG VOLUME	<u>1.5</u> FT ³
EQUIPMENT REQUIRED		ID				NAME]
WEGOWED		_	Ren	note Satellite]
		_	ľ	embly Kit	,					
			1200	J. 1110						
										ļ
NO. 38				TITLE	Optimur	n Baseline –	- Remote	- Satell	ite	
INTERRUPT										(ON TIME/CYCLE)
						NO. OF CYCLES			<u>-</u> -	(ON TIME/ CYCLE)
PREDECESS	OR TA	K N	n 138			- NO. OF CICLES				
SUCCESSOR	TASK	NO.		246, 2 hr						
AND INITIAL	L LAG	TIME								
					· · · · · · · · · · · · · · · · · · ·					
NO. OF MEN	SKILL	. IDH	IR/CYCLE	HR FROM START OF CYCLE						
1	66		3	0	ELECTRICAL	POWER100		_ w	11	HR/CYCLE
1	71		3	0	2	HR FROM	START OF C	YCLE		
		ı			SHIPPING WE	IGHT 0	LB	SHIPPIN	NG VOLUME	_0FT ³
FOLLOWENT	 		T							(See 138)
EQUIPMENT REQUIRED		ID				NAME				
Ç		14	Lid	ar						
		1-1		U. 4						

TASK NO. 40 TITLE Development of Methods of Ejecting, Operating, and Recovering Polarimeter Transponder Satellite

LEVEL Development Tests

DESCRIPTION

This task is to aid development of the transponder satellite command and control subsystem for the S-band polarimeter and will consist of evaluating methods of launching, retrieving, and controlling the attitude of the remote satellite relative to the laboratory.

The remote satellite will be launched and its controls and orientation system evaluated by executing the task from the MORL under appropriate procedures. The task will include the initial check-out procedure, the launch procedure, a series of orientation maneuvers in accordance with pre-established procedures, and the retrieval procedure. The object will be to prove the technique or to discover limitations requiring further improvements.

JUSTIFICATION

Since sea state is of interest in oceanographic applications, the measurement of relative range to the ocean surface from the laboratory has been identified as a requirement for the derivation of ocean dynamics. To perform measurements with bistatic laser radar, accurate control of the orientation and maintenance of orientation stability of the remote satellite, relative to the laboratory, is required. Consequently, a task has been specified for evaluating methods of achieving accurate control of the remote satellite system.

N.O. <u>140</u>)		TITLE	Assemble Ren System)				
INTERRUPTI	IBLE	Yes		DURA	TION (HR)	3		(ON TIME/CYCLE)
				NO.′O				
PREDECESS								
	TASK NO)						
		···						
NO. OF MEN	SKILL I	DHR/CYCLI	HR FROM START OF CYCLE					
1	60	3	0	ELECTRICAL POWER	0	w	0	HR/CYCLE
1	72	3	0	0	HR FROM STA	RT OF CYCLE		
				SHIPPING WEIGHT	500 L	_B SHIPE	PING VOLUME	9 FT ³
EQUIPMENT	٢	ID		NAM	Ε			1
REQUIRED	F	וטו		NAM	<u>E</u>			
]]	.8 S-	Band Polarin	neter				
	-	· Tr	ansponder S	atellite				
]-	· As	sembly Kit					
	ļ							
	L	<u></u>]
				Mathada at Et			1 D	
NO. <u>40</u>			TITLE	Methods of Eje Polarimeter T	ranspond	perating, a er Satellite	nd Recov	rering
INTERRUPT	IBLE _	Yes		DURA	TION (HR)		4	(ON TIME/CYCLE)
				NO. O				
PREDECESS								
SUCCESSOR AND INITIAL			246, 0 hr; 2	42, 0 hr; 138,	0 hr; 244,	0 hr		
			·					
NO. OF MEN	SKILLI	DHR/CYCLI	HR FROM START					
1	60	4	OF CYCLE 0					
1	72	4	Ö	ELECTRICAL POWER			2	HR/CYCLE
					HR FROM STA			. 9
<u> </u>				SHIPPING WEIGHT	0 L	_B SHIPI	PING VOLUME	$\frac{0}{(\text{See }140)}\text{FT}^3$
EQUIPMENT REQUIRED	٢	ID		NAM	E	-]
KEQUIKED					-			
		18 S-I	Band Polarin	neter				

71

TITLE

Assembly, Maintenance, and Repair Methods for External Optical Components

LEVEL

Development Tests

DESCRIPTION

This task is to be performed on external optical components; it requires testing of previously developed techniques for attaching or mounting optical systems external to the laboratory, testing prescribed techniques for repairing or replacing components of the optical system, and evaluating the performance of the lubrication methods employed.

The task would be performed in accordance with pre-established procedures for several installation, repair, and evaluation cycles to determine limitations and possibly to establish improved procedures and/or techniques of operation.

JUSTIFICATION

Since optical subsystems may not be permanently installed aboard the laboratory, they may be repeatedly taken outside the laboratory, installed, and operated. Therefore, procedures and techniques for the performance of this function in orbit must be developed.

NO. 71			TITI !	Assembly, Maint External Optical			for
				DURATION			TIME/CYCLE)
CYCLE PERI	OD (HR)		4	NO. OF CY			
SUCCESSOR TAND INITIAL	TASK NO.			72, 0 hr			
NO. OF MEN	60 72	HR/CYC	OF CTCLE	ELECTRICAL POWER	FROM START OF	CYCLE	
EQUIPMENT REQUIRED	-		pecial Tools Iovie Camera	NAME			

TITLE Boresight and Alignment Techniques, Alignment Feasibility

LEVEL

Development Tests

DESCRIPTION

This task requires that the equipment operator conduct experiments to determine the effectiveness with which the optical subsystem can be aligned with respect to the MORL platform. The ease, speed, and accuracy of alignment will be evaluated, and the extent to which hardware design change may be required to improve accuracy should be included in the tests.

JUSTIFICATION

Optical subsystems will be used in several instruments that operate in the IR, visible, and UV frequencies. The exact location of the Earths' surface being interrogated by each instrument will be critically dependent on the accuracy to which the optical subsystem can be aligned relative to the MORL reference system. Therefore, the accuracy achievable, subject to constraints imposed by the laboratory, must be measured.

NU	4		TITLE	Boresight and Align	<u>nment Technic</u>	jues	
INTERRUPT	IBLE	Yes	3	DURATION (HR)	4	(ON TIME / CYCLE)
CYCLE PERI	IOD (HR)	4		NO. OF CYCLES	6		
	TASK NO L LAG TIN , O hr;	ME ————————————————————————————————————	1230, 340 0 hr; 1713,) hr; 1234, 340 hr; 12 0 hr; 1716, 0 hr; 1719			
NO. OF MEN	SKILL ID	HR/CYCLE	HR FROM START OF CYCLE				
1	66 72	4 4	0 0	ELECTRICAL POWER 20 HR FROM	START OF CYCLE		_
				SHIPPING WEIGHT30	LB SHIPP	'ING VOLUME _	0.5_FT ³
EQUIPMENT REQUIRED		D Gin	baled Optica	NAME			
	-	į.	_	nment Equipment			

TASK NO. 201 TITLE Assembly and Maintenance Methods for Radar Antennas

LEVEL Development Tests

DESCRIPTION

This task requires testing of previously developed techniques for attaching or mounting antenna systems external to the laboratory, testing prescribed techniques for repairing or replacing components of the antenna system, and evaluating the performance of the lubrication methods employed. The task will be performed in accordance with preestablished procedures for several installations and cycles to detect limitations of, or possible improvements to, procedures and techniques.

The antenna system will be set up and assembled prior to operation in accordance with established procedures. These procedures will be evaluated by having trained personnel perform the setup, installation, and checkout aboard the MORL.

JUSTIFICATION

Several applications require that the distance from the laboratory to the Earth's surface be measured, and radar provides a convenient means of making such measurements. The feasibility of placing a radar antenna subsystem external to the laboratory to radiate and receive RF energy is therefore an implied task.

NO20	1		TITLE	Assembly and Maintenan	ce Methods	for Rad	<u>ar Antenn</u> a:
INTERRUPTI	BLE _		Yes	DURATION (HR)	4	(ON	TIME/CYCLE)
CYCLE PERI	OD (HR)		4	NO. OF CYCLES	3		
PREDECESS	OR TASE	K NO. <u>1, 4</u>	1, 5				
SUCCESSOR AND INITIAL				6 hr; 202, 0 hr; 103, 336 h hr; 228, 0 hr; 1236, 0 hr;			
NO. OF MEN	SKILL	ID HR/CYCLE	HR FROM START OF CYCLE				
1	66 72		0 0	ELECTRICAL POWER	OF CYCLE		HR/CYCLE
EQUIPMENT REQUIRED		ID		NAME			
WE GOWLED				Test Equipment na Assembly			

TITLE Boresight and Alignment Methods for Radar Antenna System

LEVEL

Development Task

DESCRIPTION

This task requires that the equipment operator conduct experiments to determine the effectiveness with which the antenna can be aligned with respect to the MORL platform. The ease, speed, and stability results of the alignment procedure will be evaluated to support accuracy of measurements and the extent to which hardware design changes may be required.

Procedures must be established to accomplish antenna system adjustments. Procedures and methods will be evaluated by having trained personnel make the adjustments under operational conditions while following pre-established procedures. Measurements of time required to accomplish each step will be recorded.

JUSTIFICATION

202

NO.

Several applications require that the distance from the laboratory to the Earth's surface be measured, and radar provides a convenient means of making such measurements. Therefore, the evaluation of methods for boresighting and aligning the antenna system is an implied task.

TASK PARAMETERS

TITLE Boresight and Alignment Methods - Radar Antenna

INTERRUPTI	IBLE		Yes	5		_ DURAT	TION (HR)		4		(ON TIME/CYCLE)
CYCLE PERI	OD (HR)		4			NO. OF	CYCLES		4		
PREDECESS	OR TASK	NO.	<u>l.</u>	4, 5, 201			***				
SUCCESSOR AND INITIAL			122	6, 336 hr; 1	232, 0 hr;	227,	0 hr; 228	. 0 hr	; 1723	0 hr	
NO. OF MEN	SKILLI	D HR.	/CYCLE	HR FROM START OF CYCLE							
1	66 72	4	4	0	ELECTRICAL	POWER	20		W	4	HR/CYCLE
	12		4	U	1		HR FROM STAR				
					SHIPPING WEI	GHT	50 LE	3	SHIPPING	VOLUME	FT ³
EQUIPMENT REQUIRED	Γ	ID	<u> </u>			NAME			<u> </u>		7
KEQUIKED		_	Mis	cellaneous '	Test Equip	ment					
		-	Mor	vie Camera							
	1										

TASK NO. 226 TITLE System Integration Tests — K- and C-Band Radar System

LEVEL System Integration

DESCRIPTION

This task is to be performed on K-band and/or C-band radar; it will consist of the subtasks outlined below. Subsystems will be integrated into final system for test against known conditions. The subtasks are as follows:

- 1. Determine radio interference control requirements.
- 2. Determine compatibility of antenna mount with attitude control system. Measure short-time and long-time effects.
- 3. Integrate signal processor with data storage system.
- 4. Establish and evaluate airlock and equipment handling methods.
- 5. Evaluate repair and maintenance techniques (external).
- 6. Evaluate emergency procedure resulting from overload protection failure.

JUSTIFICATION

Several applications require that the distance from the laboratory to the Earth's surface be measured and radar provides a convenient means of making such measurements. An implied task, therefore, is the evaluation of the performance of the radar system aboard the MORL.

NO. <u>122</u> INTERRUPTII	BLF		Yes			DURATION (HR)	4		(ON TIME	CYCLE
						NO. OF CYCLES			,	
						No. or croles				
AND INITIAL	LAG	TIME	220.	0 111		***************************************		 		
NO. OF MEN	CKII I	IDIUD	OVOLE	HR FROM START		*****				
NO. OF MEN		-	CYCLE	OF CYCLE						
1 1	60 66		$\begin{array}{c c}4\\4\end{array}$	0 0		POWER 0		0	HF	R/CYCLE
ı l	67		4	0		HR FROM START				
					SHIPPING WEI	GHT150 LB	SHIPPI	NG VOLUME	3	FT ³
EQUIPMENT		ID	.			NAME			1	
REQUIRED		13	Ra	dar					1	
		_		stallation Kit	-					
		_	1110	tarration in	•					
									ا	
				· · · · · · · · · · · · · · · · · · ·					J	
									_	
NO.	22	:6		TITI F	System I	Integration Test	: — K- and	C-Band	Radar	
						Integration Test				
INTERRUPTI	IBLE .		Yes		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	DURATION (HR)	4		(ON TIME	CYCLE
INTERRUPTI CYCLE PERI	IBLE .	R)	Yes 4			DURATION (HR)	4 10		(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSO	IBLE . IOD (HI OR TA	R) SK NO.	Yes 4 122	26		DURATION (HR)	4 10		(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSO	IBLE . IOD (HI OR TA TASK	R) SK NO.	Yes 4 122			DURATION (HR)	4 10		(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL	IBLE . IOD (HI OR TA TASK . LAG	R) SK NO. NO TIME	Yes 4 122	26 252, 0 hr		DURATION (HR)	4 10		(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSO SUCCESSOR	IBLE . IOD (HI OR TA TASK . LAG	R) SK NO. NO TIME	Yes 4 122	26		DURATION (HR)	4 10		(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL	IBLE . IOD (HI OR TA TASK . LAG	R) SK NO. NO TIME	Yes 4 122	26 252, 0 hr		DURATION (HR)	10		(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1	IBLE IOD (HI OR TA TASK . LAG SKILL 60 66	R) SK NO NO TIME	Yes 4 122 /CYCLE 4 4	HR FROM START OF CYCLE 0 0	ELECTRICAL	DURATION (HR) NO. OF CYCLES POWER500	4 10		(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN	IBLE IOD (HI OR TA TASK LAG SKILL	R) SK NO NO TIME	Yes 4 122 /CYCLE	HR FROM START OF CYCLE	ELECTRICAL O	DURATION (HR) NO. OF CYCLES POWER 500 HR FROM START	4 10 W	4	(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1	IBLE IOD (HI OR TA TASK . LAG SKILL 60 66	R) SK NO NO TIME	Yes 4 122 /CYCLE 4 4	HR FROM START OF CYCLE 0 0	ELECTRICAL O	DURATION (HR) NO. OF CYCLES POWER500	4 10 W	4	(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1	IBLE IOD (HI OR TA TASK . LAG SKILL 60 66 67	R) SK NO NO TIME	Yes 4 122 /CYCLE 4 4	HR FROM START OF CYCLE 0 0	ELECTRICAL O	DURATION (HR) NO. OF CYCLES POWER 500 HR FROM START	4 10 W	4 ING VOLUME	(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE IOD (HI OR TA TASK . LAG SKILL 60 66 67	R) SK NO TIME	Yes 4 122 (CYCLE 4 4	HR FROM START OF CYCLE 0 0 0	ELECTRICAL O	POWER HR FROM START	4 10 W	4 ING VOLUME	(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1	IBLE IOD (HI OR TA TASK . LAG SKILL 60 66 67	R) SK NO TIME	Yes 4 122 /CYCLE 4 4	HR FROM START OF CYCLE 0 0 0	ELECTRICAL O	POWER HR FROM START	4 10 W	4 ING VOLUME	(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1	IBLE IOD (HI OR TA TASK . LAG SKILL 60 66 67	R) SK NO TIME	Yes 4 122 (CYCLE 4 4	HR FROM START OF CYCLE 0 0 0	ELECTRICAL O	POWER HR FROM START	4 10 W	4 ING VOLUME	(ON TIME	CYCLE
INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1	IBLE IOD (HI OR TA TASK . LAG SKILL 60 66 67	R) SK NO TIME	Yes 4 122 (CYCLE 4 4	HR FROM START OF CYCLE 0 0 0	ELECTRICAL O	POWER HR FROM START	4 10 W	4 ING VOLUME	(ON TIME	CYCLE

TITLE Radar Lock-On Procedure for Acquisition of Test Targets

LEVEL

Development Tests

DESCRIPTION

This task is to be performed on the display and control equipment associated with K- and C-band radars. The task requires that the equipment operator conduct tests to determine accuracy and effectiveness of procedures for acquiring and tracking targets.

A target generator will be used to evaluate lock-on and target acquisition procedures. The operators will follow pre-established procedure to acquire and track the targets for specified time periods. Data for determining time to acquire, accuracy of tracking, and target handling capacity will be recorded.

JUSTIFICATION

Since several applications require that the distance from the laboratory to the Earth's surface be measured accurately, radar has been specified for making such measurements. Because tracking and target acquisition will be performed by the operator in the laboratory, it is essential that the effectiveness of procedures for locking on to test targets be evaluated.

NO. <u>22</u>	7		TITL	E Radar Lock-On I	Procedur	·e		
INTERRUPTI	BLE	Yes	3	DURATION (HR)	2	(ON TIME/CYCLE)
				NO. OF CYC				
Ī								
			6, 0.5 hr					
AND INITIAL	LAG II	ME.						
NO. OF MEN	SKILL II	DHR/CYCLE	HR FROM STAR OF CYCLE	Ī				
1	62	2	0	ELECTRICAL POWER	500	W	11	HR/CYCLE
				1 HR F	ROM START O	F CYCLE		
				SHIPPING WEIGHT	150 LB	SHIPPIN	G VOLUME	3 FT ³
EQUIPMENT	Γ	ID		NAME				
kEQUIRED	<u> </u>	- Spe	cial Test E					
	.			ntrol Equipment Coi	mponents	3		
			, ,			•		
							-	

TITLE Radar Control System Tracking Capability

TASK NO. 228

LEVEL Development Tests

DESCRIPTION

This task is to be performed on the control system associated with radar tracking. System lags and time constants involved in both equipment and operator performance will be evaluated.

The task requires that the equipment operator conduct experiments to determine the performance of the radar control and acquisition equipments. The radar control systems will be operated in the MORL by a trained radar operator, who will perform a series of tests, using simulated targets, to evaluate the adequacy and/or limitations of the radar control system. These tests will require the monitoring, under controlled conditions, of measurements of speed to acquire, information content at the display, lock-on indication and accuracy, and reacquisition time.

JUSTIFICATION

Several applications require accurate measurements of the distance from the laboratory to the ocean surface, and radar has been specified for this purpose. Thus, the evaluation of tracking accuracy and performance limitations of the control and tracking subsystems is an implied task; and, because tracking and target acquisition will probably be performed by the operator in the laboratory, evaluation of the effectiveness of procedures for locking-on to test targets is essential.

NO. <u>ZZ</u>	8			TITLE	Radar Control System	Tracking (apability		
INTERRUPTI	BLE _	Yes	5		DURATION (HR)	4		(ON TIME	CYCLE)
CYCLE PERI	OD (HR)	4			NO. OF CYCLES	5			
PREDECESSO	OR TASK	K NO.	201,	202					
SUCCESSOR AND INITIAL			226, ().5 hr					
NO. OF MEN	SKILL	ID HR.	/CYCLE	HR FROM START OF CYCLE					
1	67		4	0	ELECTRICAL POWER	W _	3	Н	R/CYCLE
1	71		4	0	HR FROM ST	ART OF CYCLE			,
					SHIPPING WEIGHT15	LB SHI	PPING VOLUME	0.5	5 FT`
EQUIPMENT REQUIRED		ID			NAME				
KEQOMED		-		ar Control S cial Test Eq	ystem Components uipment				

Lock-On Procedure for Acquisition of Test Targets by an Optical Driftmeter

LEVEL

Development Tests

DESCRIPTION

This task is to be performed on the display and control equipment associated with the optical driftmeter; it requires that the equipment operator conduct tests to determine the accuracy and effectiveness of procedures for acquiring and tracking targets.

The optical driftmeter control system will be operated in the MORL by a trained operator, who will perform a series of tests, using simulated targets, to evaluate the adequacy or limitations of the optical driftmeter control system. These tests will require the monitoring under controlled conditions, of measurements of speed to acquire, information content at the display, lock-on indication and accuracy, and reacquisition time.

JUSTIFICATION

Tsunami warning information might be derived from accurate measurement of distance from the laboratory to the ocean surface, and an optical driftmeter has been specified for making such measurements. Since tracking and target acquisition will probably be performed by an operator in the laboratory, it is essential that the effectiveness of procedures for lock-on to test targets be evaluated.

NO22	29		TITLE	Lock-On ProcedureOptical Dri	ftmeter
INTERRUPT	IBLE	Yes		DURATION (HR) 4	(ON TIME/CYCLE
CYCLE PER	IOD (HR)	4		NO. OF CYCLES 5	
PREDECESS	OR TASK	NON	one		
SUCCESSOR AND INITIAL			0.5 hr		
NO. OF MEN	SKILL I	HR CYCLE	HR FROM START OF CYCLE		
1	60	4	0	ELECTRICAL POWER 20 W	3 HR/CYCLE
1	66	4	0	1 HR FROM START OF CYCLE	
	<u></u>			SHIPPING WEIGHT 15 LB SHIPPIN	NG VOLUME FT
EQUIPMENT REQUIRED		ID		NAME	
*EQUITED		- Opt	ical Driftme	ter Display and Control Equipment	

TITLE System Integration Tests of Optical Driftmeter

LEVEL System Integration Tests

DESCRIPTION

TASK NO.

230

This task will consist of the subtasks listed below and will be performed on the optical driftmeter. The subsystems will be combined to form the final system and conduct tests against known targets. The subtasks are as follows:

- 1. Integrate signal processor with data storage system.
- 2. Evaluate airlock and equipment handling methods.
- 3. Evaluate repair and maintenance techniques (external).
- 4. Evaluate emergency procedure resulting from overload protection failure.

JUSTIFICATION

Since Tsunami warning information can be derived from accurate measurement of distance from the laboratory to the ocean surface, an optical driftmeter (or V/H meter) has been specified as a possible means of making such measurements. The performance of the optical driftmeter when receiving the passive radiation from the ocean's surface is therefore an implied task.

This specific task evaluates the integration of the optical driftmeter with the orbital laboratory and cooperative instruments. The task must be completed before actual use of the instrument.

NO. <u>1230</u> INTERRUPTIBLE _	Yes		DUR	ATION (HR)	4		(ON TIME / CVCLE
CYCLE PERIOD (HR	4		NO.	OF CYCLES	2		- (ON TIME) OFFICE
PREDECESSOR TAS	K NO7]	, 72, 229, 2	231	0. 0.0220 =			
SUCCESŞOR TASK N	o. <u>230,</u>	0 hr					
AND INITIAL LAG T	IME						
NO. OF MENISKILL	IDNB/CVCL E	HR FROM START	1				
	+	OF CYCLE	-				
1 66	4	0	ELECTRICAL POWE	R0		WO	HR/CYCLE
1 72	4	0		_ HR FROM ST			_
	<u> </u>		SHIPPING WEIGHT _	150	LB	SHIPPING VOLUM	3 FT ³
EQUIPMENT [ID	-	NA.	 ME			
REQUIRED		otical Driftm	·	IVIC.			
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	1	starration 131	L				
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NO 230		TITLE	System Int		T 4	0 11 1 5 16	
			System Int				
INTERRUPTIBLE _	Yes		DUR/	ATION (HR)	4		. (ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD(HR)	Yes 4			ATION (HR)	4		. (ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD(HR PREDECESSOR TASI	Yes 4 (NO12	30	DUR/	ATION (HR)	4		. (ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD(HR)	Yes $\frac{4}{(N012)}$ 0. $\frac{253}{(N012)}$	30	DUR/	ATION (HR)	4		. (ON TIME/CYCLE)
INTERRUPTIBLE CYCLE PERIOD (HR) PREDECESSOR TASI SUCCESSOR TASK N	Yes $\frac{4}{(N012)}$ 0. $\frac{253}{(N012)}$	30 l hr	DUR/	ATION (HR)	4		. (ON TIME/CYCLE)
INTERRUPTIBLE CYCLE PERIOD (HR) PREDECESSOR TASI SUCCESSOR TASK N	Yes 4 (NO. 12 0. 253,	30 1 hr HR FROM START	DUR/	ATION (HR)	4		. (ON TIME/CYCLE)
INTERRUPTIBLE CYCLE PERIOD (HR: PREDECESSOR TASK SUCCESSOR TASK N AND INITIAL LAG T	Yes 4 (NO. 12 0. 253,	30 1 hr	DUR/	ATION (HR)	4		(ON TIME/CYCLE)
INTERRUPTIBLE CYCLE PERIOD (HR PREDECESSOR TASK SUCCESSOR TASK N AND INITIAL LAG T NO. OF MEN SKILL	Yes 4 (NO. 12 0. 253, IME	30 1 hr HR FROM START OF CYCLE	DUR/ NO.	ATION (HR) OF CYCLES R 500	4	_ W4	(ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD (HR PREDECESSOR TASK N AND INITIAL LAG T NO. OF MEN SKILL 1 60	Yes 4 (NO. 12 0. 253, IME D HR/CYCLE 4	HR FROM START OF CYCLE O	ELECTRICAL POWER	ATION (HR) OF CYCLES R 500 HR FROM STA	4 4 ART OF C	_ W4_ YCLE	(ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD (HR PREDECESSOR TASK N AND INITIAL LAG T NO. OF MEN SKILL 1 60 1 66	Yes 4 (NO. 12 0. 253, IME D HR/CYCLE 4 4	HR FROM START OF CYCLE 0 0	ELECTRICAL POWER	ATION (HR) OF CYCLES R 500 HR FROM STA	4 4 ART OF C	_ W4_ YCLE	(ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD (HR PREDECESSOR TASK N AND INITIAL LAG T NO. OF MEN SKILL 1 60 1 66 1 67 EQUIPMENT	Yes 4 (NO. 12 0. 253, IME D HR/CYCLE 4 4	HR FROM START OF CYCLE 0 0	ELECTRICAL POWER O SHIPPING WEIGHT	ATION (HR) OF CYCLES R 500 _ HR FROM STA	4 4 ART OF C	_ W4	(ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD (HR PREDECESSOR TASK N AND INITIAL LAG T NO. OF MEN SKILL 1 60 1 66 1 67	Yes 4 (NO. 12 0. 253, ME DHR/CYCLE 4 4 4	HR FROM START OF CYCLE 0 0 0	ELECTRICAL POWER O SHIPPING WEIGHT	ATION (HR) OF CYCLES R 500 _ HR FROM STA	4 4 ART OF C	_ W4_ YCLE	(ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD (HR PREDECESSOR TASK N AND INITIAL LAG T NO. OF MEN SKILL 1 60 1 66 1 67 EQUIPMENT	Yes 4 (NO. 12 0. 253, ME DHR/CYCLE 4 4 4	HR FROM START OF CYCLE 0 0	ELECTRICAL POWER O SHIPPING WEIGHT	ATION (HR) OF CYCLES R 500 _ HR FROM STA	4 4 ART OF C	_ W4_ YCLE	(ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD (HR PREDECESSOR TASK N AND INITIAL LAG T NO. OF MEN SKILL 1 60 1 66 1 67 EQUIPMENT	Yes 4 (NO. 12 0. 253, ME DHR/CYCLE 4 4 4	HR FROM START OF CYCLE 0 0 0	ELECTRICAL POWER O SHIPPING WEIGHT	ATION (HR) OF CYCLES R 500 _ HR FROM STA	4 4 ART OF C	_ W4_ YCLE	(ON TIME/CYCLE)
INTERRUPTIBLE _ CYCLE PERIOD (HR PREDECESSOR TASK N AND INITIAL LAG T NO. OF MEN SKILL 1 60 1 66 1 67 EQUIPMENT	Yes 4 (NO. 12 0. 253, ME DHR/CYCLE 4 4 4	HR FROM START OF CYCLE 0 0 0	ELECTRICAL POWER O SHIPPING WEIGHT	ATION (HR) OF CYCLES R 500 _ HR FROM STA	4 4 ART OF C	_ W4_ YCLE	(ON TIME/CYCLE)

Tracking Capability of Control System for Optical TITLE Driftmeter

LEVEL

Development Tests

DESCRIPTION

This task is to be performed on the control system associated with optical tracking and the evaluation of system lags and time constants involved in both equipment and operator performance. The task requires that the equipment operator conduct experiments to determine tracking accuracy and evaluate tracking procedures. The radar control system will be operated in the MORL by a trained radar operator, who will perform a series of tests, using simulated targets, to evaluate the adequacy and/or limitations of the driftmeter control system. These tests will require that measurements of speed to acquire, information content at the display, lock-on indication and accuracy, and reacquisition time be monitored under controlled conditions.

JUSTIFICATION

231

Since Tsunami warning information can be derived from accurate measurement of distance from the laboratory to the ocean surface, a driftmeter has been specified for making such measurements. Thus, evaluation of tracking accuracy and performance limitations of the tracking and control subsystems is an implied task. Also, since tracking and target acquisition will probably be performed by the operator in the laboratory, it is essential that the effectiveness of procedures for locking-on to test targets be evaluated.

NO. <u>231</u>			TITLE	<u> </u>	ng Capabi	llityV	/h Mete	er Contr	ol Syste	∍m
INTERRUPTIBL	E <u>Y</u> (HR) <u></u> TASK NO SK NO.	es 4 Nor	ıe		DURATION (HR	s 5				
1	1LL ID HF 66 71	CYCLE 4 4	HR FROM START OF CYCLE O O	ELECTRICAL P 1 SHIPPING WEIG	HR FROM	M START OF	CYCLE			
EQUIPMENT REQUIRED	- - -	T	ontrol Syster arget Simula secial Test E	tor	NAME_ nts					

TITLE System Integration Tests of Radar Profilometer

LEVEL System Integration Tests

232

DESCRIPTION

TASK NO.

This task will be performed on the K-Band Profilometer. The integrated system will be evaluated against known targets. This task consists of the following subtasks:

- 1. Determine radio interference control needs.
- 2. Determine compatibility of antenna mount with attitude control system. Measure short-time and long-time effects.
- 3. Integrate signal processor with data storage system.
- 4. Establish and evaluate airlock and equipment handling methods.
- 5. Evaluate repair and maintenance techniques (external).
- 6. Evaluate emergency procedure resulting from overload protection failure.

JUSTIFICATION

Since information about beaches and harbors can be derived from ocean profile measurements, a radar profilometer has been specified as a possible means of making such measurements.

The radar profilometer will be integrated into the orbiting laboratory and cooperative instrument systems. This task will be accomplished prior to making system evaluation measurements.

NO. 12 INTERRUPT		Yes			DURATION (HR)	4		(ON TIME / CYCLE
CYCLE PER	IOD (HR)	4			NO. OF CYCLES	18		(ON TIME OTOLL
PREDECESS	OR TASK	NO20)1, 202, 233					
	TASK NO	232,						
		1	LUD EDOM STADE	7				
NO. OF MEN	SKILL IC	HR/CYCLE	HR FROM START OF CYCLE]				
1	60	4	0	ELECTRICAL	POWER	0	W	O HR/CYCLE
1	67	4	0		HR FROM			
1	72	4	0	SHIPPING WEIG	SHT150	LB	SHIPPING VOL	UME3 FT
EQUIPMENT	Г	D			NAME	 		
REQUIRED	Γ.	- R	adar Profile	ometer				
	-	- I1	nstallation K	it				
		- 1						1
	İ							j
	L							
NO2	32		TITLE	Systen	n Integratio	n Test-	Radar Pro	ofilometer
			TITLE					
INTERRUPT	IBLE	Yes			DURATION (HR)	4		ofilometer (ON TIME CYCLE
INTERRUPT	IBLE	Yes 4			DURATION (HR)	4		(ON TIME CYCLE)
INTERRUPT CYCLE PER PREDECESS SUCCESSOR	IBLE IOD (HR) OR TASK TASK NO.	Yes 4 NO12 254,	232		DURATION (HR)	4		(ON TIME CYCLE)
INTERRUPT CYCLE PER PREDECESS	IBLE IOD (HR) OR TASK TASK NO.	Yes 4 NO12 254,	232		DURATION (HR)	4		(ON TIME CYCLE)
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL	IBLE IOD (HR) OR TASK TASK NO. LAG TIM	Yes 4 NO12 254,	232 0.5 hr		DURATION (HR)	4		(ON TIME CYCLE)
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN	IBLE IOD (HR) OR TASK TASK NO. LAG TIM	Yes 4 NO. 12 254, E	232 0.5 hr HR FROM START OF CYCLE		DURATION (HR)	6		(ON TIME CYCLE
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN	IBLE	Yes 4 NO12 254, E HR/CYCLE	HR FROM START OF CYCLE 0		DURATION (HR)	6		(ON TIME CYCLE)
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1	IBLEODD (HR) OR TASK NO. LAG TIME SKILL ID 60 66	Yes 4 NO. 12 254, E HR/CYCLE 4 4	HR FROM START OF CYCLE 0	ELECTRICAL F	DURATION (HR)	0	W4	(ON TIME CYCLE
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN	IBLE	Yes 4 NO12 254, E HR/CYCLE	HR FROM START OF CYCLE 0	ELECTRICAL F	POWER 50 HR FROM S	4 6 0 START OF (W4	(ON TIME CYCLE) HR/CYCLE
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1	IBLE	Yes 4 NO. 12 254, E HR/CYCLE 4 4	HR FROM START OF CYCLE 0	ELECTRICAL F	POWER 50 HR FROM S	4 6 0 START OF (W4	(ON TIME CYCLE
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE	Yes 4 NO. 12 254, E HR/CYCLE 4 4 4	HR FROM START OF CYCLE 0 0	ELECTRICAL F O SHIPPING WEIG	POWER 50 HT 0	4 6 0 START OF (W4	(ON TIME CYCLE) HR/CYCLE
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1	IBLE	Yes 4 NO. 12 254, E HR/CYCLE 4 4 4	HR FROM START OF CYCLE 0	ELECTRICAL F O SHIPPING WEIG	POWER 50 HT 0	4 6 0 START OF (W4	(ON TIME CYCLE) HR/CYCLE
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1	IBLE	Yes 4 NO. 12 254, E HR/CYCLE 4 4 4	HR FROM START OF CYCLE 0 0	ELECTRICAL F O SHIPPING WEIG	POWER 50 HT 0	4 6 0 START OF (W4	(ON TIME CYCLE) HR/CYCLE
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1	IBLE	Yes 4 NO. 12 254, E HR/CYCLE 4 4 4	HR FROM START OF CYCLE 0 0	ELECTRICAL F O SHIPPING WEIG	POWER 50 HT 0	4 6 0 START OF (W4	(ON TIME CYCLE) HR/CYCLE

TASK NO. 233 TITLE Lock-On Procedures and Target Acquisition Methods--Radar Profilometer Controls and Displays Subsystem

LEVEL Development Tests

DESCRIPTION

This task will be performed on the controls and displays subsystem of the K-band radar profilometer. The task requires that the equipment operator conduct experiments to determine the performance of the profilometer control and acquisition equipments. The system will be operated in the MORL by a trained operator who will perform a series of tests, using simulated targets, to evaluate the adequacy and/or limitations of the profilometer control system. These tests will require the monitoring, under controlled conditions, of measurements of speed to acquire, information content at the display, lock-on indication and accuracy, and reacquisition time.

JUSTIFICATION

The need for relative range measurements of the sea surface/land surface interface variation requires a range measuring device. A K-band profilometer can be used to make these measurements. Development of methods of acquiring targets and of aligning the control and display system with respect to the laboratory coordinate reference is an implied task. Orientation of the control system and monitoring display will be required to establish target acquisition, target lock, and area scan.

NO. <u>23</u>	3			TITLE	Lock- Displa	On Proce ly Subsyst	dures- tem	V/h	Cont	rols an	.d
INTERRUPT	IBLE IOD (HR)	<u>Y</u>	es 4	nn e		DURATION (H	IR) _ES	5			(ON TIME/CYCLE)
SUCCESSOR AND INITIAL	TASK NO	O IME	1232,	0 hr						<u> </u>	
NO. OF MEN	SKILL I	id HR.	'CYCLE	HR FROM START OF CYCLE					,		
1	67 71	İ	4	0	1	HR FR	OM START	OF CYC	CLE		HR/CYCLE
EQUIPMENT REQUIRED		ID	Та	h Meter Con arget Simula ecial Test E	tor	NAME Displays	Comp	onent	S		

TASK NO. 234 TITLE System Integration Tests of Camera System

LEVEL Systems Integration Tests

DESCRIPTION

This task will be performed on a variable focal length, high-speed, large format camera. It consists of the following subtasks:

- 1. Mount compatibility with optics and interchangeability evaluation.
- 2. Use of dark room and film handling procedures.
- 3. Data storage and retrieval techniques.
- 4. Comparison of photographic data with known target characteristics.

A system integration test requires that the entire camera system be operated with all combinations of optics, film, and film processing. Tests will be conducted using pre-established procedures and will employ known targets.

JUSTIFICATION

Photography will be used to obtain information relating to sea state, shallow water characteristics of the ocean bottom, and certain phenomena associated with the shoreline interface.

Camera systems, including automatic tracking equipment, must be integrated with the orbiting laboratory and cooperative instruments prior to evaluation tests.

			Install Camera System	1	
INTERRUPTIBLE	<u>Yes</u>		DURATION (HR)4	<u> </u>	TIME/CYCLE)
CYCLE PERIOD (F	HR) <u>4</u>		NO. OF CYCLES4	<u> </u>	
PREDECESSOR TA	ASK NO	16, 72, 235			
SUCCESSOR TASK AND INITIAL LAG	NO. 234				
		T., =			
NO. OF MEN SKIL	L IDHR CYCLE	HR FROM START OF CYCLE			
1 6	0 4	0	ELECTRICAL POWERO	w O	UB /a
1 7	2 4	0	O HR FROM START (HR/CYCLE
		ļ			3
			SHIPPING WEIGHT LB	SHIPPING VOLUME	<u>0.5</u> FT
EQUIPMENT REQUIRED	ID		NAME		
we down p	- Can	nera Installat	tion Kit		
	19 Cam				
					
NO. <u>234</u>		TITLE	System Integration Test	Camera Sustana	
NO. <u>234</u>	Yes	TITLE	System Integration Test	Camera Systems	
MIEKKOPIIBLE .	162		DURATION (HR)2	(ON 7	IME/CYCLE)
CYCLE PERIOD (H	R)2		System Integration Test DURATION (HR)	(ON 7	IME/CYCLE)
CYCLE PERIOD (H PREDECESSOR TA	R)2 SK NO123	4	DURATION (HR)2	(ON 7	IME/CYCLE)
CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK	R)2 SK NO123 NO	4	DURATION (HR)2	(ON 7	IME/CYCLE)
CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK	R)2 SK NO123 NO	4 , 0.25 hr	DURATION (HR)2	(ON 7	IME/CYCLE)
CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK AND INITIAL LAG	R) 2 SK NO 123 NO 255 TIME	4 , 0.25 hr HR FROM START	DURATION (HR)2	(ON 7	IME/CYCLE)
CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK AND INITIAL LAG	R) 2 SK NO 123 NO 255 TIME	4 , 0.25 hr	DURATION (HR) 2 NO. OF CYCLES 5	(ON 1	TIME / CYCLE)
CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK AND INITIAL LAG NO. OF MEN SKILL	R) 2 SK NO 123 NO 255 TIME	4 , 0.25 hr HR FROM START OF CYCLE	DURATION (HR) 2 NO. OF CYCLES 5 ELECTRICAL POWER 10	(ON 1	TIME / CYCLE)
CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK AND INITIAL LAG NO. OF MEN SKILL	R) 2 SK NO 123 NO 255 TIME	4, 0.25 hr HR FROM START OF CYCLE 0	DURATION (HR) 2 NO. OF CYCLES 5 ELECTRICAL POWER 10 0	(ON 1	HR/CYCLE
CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK AND INITIAL LAG NO. OF MEN SKILL	R) 2 SK NO 123 NO 255 TIME	4, 0.25 hr HR FROM START OF CYCLE 0	DURATION (HR) 2 NO. OF CYCLES 5 ELECTRICAL POWER 10 0	(ON 1	HR/CYCLE
CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILL 1 60	R) 2 SK NO 123 NO 255 TIME ID HR/CYCLE 2	4, 0.25 hr HR FROM START OF CYCLE 0	DURATION (HR) 2 NO. OF CYCLES 5 ELECTRICAL POWER 10 HR FROM START O SHIPPING WEIGHT 0 LB	(ON 1	HR/CYCLE
CYCLE PERIOD (HEREDECESSOR TASK AND INITIAL LAGE) NO. OF MEN SKILL 1 60	R) 2 SK NO 123 NO 255 TIME ID HR/CYCLE 2	4, 0.25 hr HR FROM START OF CYCLE 0	DURATION (HR) 2 NO. OF CYCLES 5 ELECTRICAL POWER 10 0	(ON 1	HR/CYCLE
CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILL 1 60	R) 2 SK NO 123 NO 255 TIME ID HR/CYCLE 2	4, 0.25 hr HR FROM START OF CYCLE 0	DURATION (HR) 2 NO. OF CYCLES 5 ELECTRICAL POWER 10 HR FROM START O SHIPPING WEIGHT 0 LB	(ON 1	HR/CYCLE
CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILL 1 60	R) 2 SK NO 123 NO 255 TIME ID HR/CYCLE 2	4, 0.25 hr HR FROM START OF CYCLE 0	DURATION (HR) 2 NO. OF CYCLES 5 ELECTRICAL POWER 10 HR FROM START O SHIPPING WEIGHT 0 LB	(ON 1	HR/CYCLE
CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILL 1 60	R) 2 SK NO 123 NO 255 TIME ID HR/CYCLE 2	4, 0.25 hr HR FROM START OF CYCLE 0	DURATION (HR) 2 NO. OF CYCLES 5 ELECTRICAL POWER 10 HR FROM START O SHIPPING WEIGHT 0 LB	(ON 1	HR/CYCLE
CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK AND INITIAL LAG NO. OF MEN SKILL	R) 2 SK NO 123 NO 255 TIME ID HR/CYCLE 2	4, 0.25 hr HR FROM START OF CYCLE 0	DURATION (HR) 2 NO. OF CYCLES 5 ELECTRICAL POWER 10 HR FROM START O SHIPPING WEIGHT 0 LB	(ON 1	HR/CYCLE

TASK NO. 235 TITLE Dynamic Interaction of Camera Mount with MORL--Effect on Image Motion Compensation

LEVEL Development Test

DESCRIPTION

This task is to be performed on the telescope mount of the variable focal length camera. Dynamic interaction measurements will be made to determine errors and the need for image motion compensation. The camera will be used to photograph surface targets of known characteristics. The photographs will be compared to photographs taken at much slower speed and with a camera of equivalent focal length and resolution. The comparison will establish the need for image motion compensation for shutter speed changes.

JUSTIFICATION

Photography will be used to obtain information relating to sea state, shallow water characteristics of the ocean bottom, and certain phenomena associated with the shoreline interface. Therefore, evaluation of the need for image motion compensation and of accuracy limits is an implied task.

Development tests may be required for an optical telescope mount and for image motion compensation methods. Operation of a fast shutter over extended periods may require special techniques for image motion compensation in an orbital environment.

INTERRUPTIBL	E	Yes		Install Camera Mount DURATION (HR) 4	(ON TIME / OVOLE
CYCLE PERIOD	(HR)	4		NO. OF CYCLES 2	- (ON TIME/ CICEL
PREDECESSOR	TASK NO	N	one		
SUCCESSOR TA	SK NO.	23	35, 0 hr		
NO. OF MEN SK	(ILL IDHI	R/CYCLE	HR FROM START OF CYCLE O	ELECTRICAL POWEROO	UR/OVOLS
1	72	4	0	O HR FROM START OF CYCLE	HR/CYCLE
		į		SHIPPING WEIGHT 20 LB SHIPPING VOLUME	- 0.5 FT ³
EQUIPMENT			-		- <u>- </u>
REQUIRED	1D 19	Cam	era	NAME	_
	_	İ	era Mount		
	_		llation Kit		
	L	<u> </u>			
		<u> </u>			_
]
NO23	35	1	TITLE		_
NO. <u>2</u>	35 E <u>Ye</u> :	5	TITLE		ON TIME (CYCLE)
INTERRUPTIBL	E <u>Ye</u> :	5		DURATION (HR)1	(ON TIME/CYCLE)
INTERRUPTIBL	E <u>Ye</u> : (HR)	s 2		Dynamic InteractionCamera/MORL DURATION (HR) 1 NO. OF CYCLES 4	(ON TIME/CYCLE)
INTERRUPTIBLICYCLE PERIOD PREDECESSOR SUCCESSOR TAS	E <u>Ye:</u> (HR) <u> </u>	2 123	5	DURATION (HR)1	(ON TIME/CYCLE)
INTERRUPTIBLICYCLE PERIOD PREDECESSOR	E <u>Ye:</u> (HR) <u> </u>	2 123	5	DURATION (HR)1	(ON TIME/CYCLE)
INTERRUPTIBLICYCLE PERIOD PREDECESSOR SUCCESSOR TAS	E Ye: (HR) TASK NO. G TIME	2 	5 4, 0.5 hr	DURATION (HR) 1 NO. OF CYCLES 4	(ON TIME/CYCLE)
INTERRUPTIBLE CYCLE PERIOD PREDECESSOR SUCCESSOR TAS AND INITIAL LA NO. OF MEN SKI	E Ye: (HR) TASK NO. G TIME	2 	5 4, 0.5 hr	DURATION (HR) 1 NO. OF CYCLES 4	(ON TIME / CYCLE)
INTERRUPTIBLICYCLE PERIOD PREDECESSOR TAS AND INITIAL LA	E Ye: (HR) TASK NO. SK NO. G TIME	2 2 123 123	5 4, 0.5 hr HR FROM START OF CYCLE	DURATION (HR) 1 NO. OF CYCLES 4 ELECTRICAL POWER 10 W 0.5	(ON TIME / CYCLE)
CYCLE PERIOD PREDECESSOR TAS AND INITIAL LA	E Ye: (HR) TASK NO. SK NO. G TIME	2 2 123 123	5 4, 0.5 hr HR FROM START OF CYCLE	DURATION (HR) 1 NO. OF CYCLES 4 ELECTRICAL POWER 10 W 0.5 0.5 HR FROM START OF CYCLE	(ON TIME / CYCLE) HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI 1	E Ye: (HR) TASK NO. SK NO. G TIME	2 2 123 123	5 4, 0.5 hr HR FROM START OF CYCLE	DURATION (HR) 1 NO. OF CYCLES 4 ELECTRICAL POWER 10 W 0.5	(ON TIME / CYCLE) HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 EQUIPMENT	E Ye: (HR) TASK NO. SK NO. G TIME	2 2 123 123	5 4, 0.5 hr HR FROM START OF CYCLE	DURATION (HR) 1 NO. OF CYCLES 4 ELECTRICAL POWER 10 W 0.5 0.5 HR FROM START OF CYCLE	(ON TIME / CYCLE) HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 EQUIPMENT	E Ye: (HR) TASK NO. SK NO. SC TIME	2 2 123 123	5 4, 0.5 hr HR FROM START OF CYCLE 0	DURATION (HR) 1	(ON TIME / CYCLE) HR/CYCLE
CYCLE PERIOD PREDECESSOR TAS AND INITIAL LA	E Ye: (HR) TASK NO. SK NO. SC TIME LL ID HR	2 123 123 /CYCLE	5 4, 0.5 hr HR FROM START OF CYCLE 0	DURATION (HR) 1	(ON TIME / CYCLE) HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 EQUIPMENT	E Ye: (HR) TASK NO. SK NO. SC TIME LL ID HR	2 123 123 /CYCLE	5 4, 0.5 hr HR FROM START OF CYCLE 0	DURATION (HR) 1	(ON TIME / CYCLE) HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 EQUIPMENT	E Ye: (HR) TASK NO. SK NO. SC TIME LL ID HR	2 123 123 /CYCLE	5 4, 0.5 hr HR FROM START OF CYCLE 0	DURATION (HR) 1	(ON TIME / CYCLE) HR/CYCLE

TITLE System Integration Test-- Microwave Radiometer

TASK NO. 236

LEVEL System Integration Tests

DESCRIPTION

The radiometer will be assembled as a system and operated to establish its ability to measure sea surface temperature with instrumented surface targets. Measurements of sea surface temperature will be compared to known values to establish correction tables under varying atmospheric conditions of fog. Tests will be conducted to determine accuracy, range, resolution, and to resolve effects of clouds and fog on microwave and infrared measurements.

Subtasks are the following:

- 1. Establish compatibility of optics filter and mount.
- 2. Determine electromechanical interference.
- 3. Establish compatibility with attitude control system.
- 4. Evaluate calibration methods.

JUSTIFICATION

Since the passive microwave radiation from the ocean's surface is potentially useful in collecting data for several oceanographic applications, a task has been specified for monitoring this radiation.

The 12-17 KMC radiometer promises better capability to penetrate fog for detecting temperature contrast at the ocean surface. This radiometer must be integrated with laboratory systems and cooperating instruments before it is used.

.NO12	36			TITLE	Install	Microwa	ave Radi	ometer	•	
										(ON TIME/CYCLE)
SUCCESSOR T	TASK N	10								
						<u> </u>				
NO. OF MEN	SKILL	ID HR/	CYCLE	HR FROM START OF CYCLE	l					
1	60		4	0	ELECTRICAL	POWER	0	w	0	HR/CYCLE
1 1	66		4	0	0					
1	67		4	0	SHIPPING WEI	GHT2	<u>0</u> LB	SH	IPPING VOLUME	0.5FT ³
EQUIPMENT	ſ	ID				NAME				7
REQUIRED	ļ	12	Mic	rowave Radi	ometer.					1
		_	Inst	allation Kit						
			•							
	•									
NO2	236			TITLE	System	Integra	tion Tes	tMic	crowave Ra	adiometer
INTERRUPTI	IBLE _	Yes	3			. DURATION	(HR)	4		(ON TIME/CYCLE)
CYCLE PERI	IOD (HF	R)	4			. NO. OF CY	CLES2	0		
PREDECESSO	OR TAS	SK NO.	1	236						
SUCCESSOR			2	56, 0.5 hr			, .			
AND INITIAL	. LAG	INE		·····						
NO. OF MEN	SKILL	IDHR	/CYCLE	HR FROM START OF CYCLE						
1	60	+	4	0	CI ECTRICAL	DOWED	2.0	tar	4	HR/CYCLE
1	66		4	0	1 -		FROM START			HR/CYCLE
1	67		4	0						- 03
	01		T	0	3HIPPING WEI	GH1	FR	21	IIPPING VOLUME	$\frac{0}{(\text{See } 1236)}$ FT ³
EQUIPMENT		ID	T			NAME				7
REQUIRED		12	Mic	rowave Radi	ometer		-			
		12	IVIIC.	Iowave Naui	Officier					
			:							
										ī

TASK NO. 237 TITLE Absolute Accuracy Test of Black-Body Calibration Reference for Microwave Radiometer

LEVEL Development Tests

DESCRIPTION

A microwave radiometer requires that a calibrating device be part of the equipment. The stability and associated variation will be measured in the MORL environment. This task is performed on the black-body calibration reference for the K-band radiometer. The calibration device will be installed and operated as part of the system. Measurements will be recorded while radiation from a known source is monitored, and accuracy subsequently will be determined.

JUSTIFICATION

Since the passive microwave radiation from the ocean's surface is useful for collecting data for weather forecasting applications, a task has been specified for monitoring this radiation. The development and testing for a calibration device reference is an implied task.

A calibration and reference device will be required for operation with the radiometer. Its accuracy, stability, and general characteristics will be tested in the MORL orbital environment.

NO23	37		TITLE	Absolu Black-	te Accu Body C	iracy Talibras	Γest tion Re	Micro eferen	wave Ra ce	adiometer
	R)	0.5	2 21		NO. OF CY	CLES	1	<u> </u>		(ON TIME CYCLE)
SUCCESSOR TASK AND INITIAL LAG		123	6, 0 hr				- ·			
NO. OF MEN SKILL		CYCLE	HR FROM START OF CYCLE O	ELECTRICAL F	HR	FROM STA	RT OF CY	CLE		HR/CYCLE 0.5 FT ³
EQUIPMENT REQUIRED	1D 12 - -	Cali	rowave Radi bration Dev	ice	NAME					

LEVEL System Integration Tests

DESCRIPTION

TASK NO. 239

The IR radiometer system will be installed and operated in accordance with a preestablished procedure for performance of all subtasks. Data will be recorded and will be compared with known surface measurements to evaluate system performance. Final system tests will be conducted for accuracy, range, and resolution.

Subtasks are as follows:

- 1. Determine compatibility of optics, filter, and mount.
- 2. Evaluate electromechanical interference.
- 3. Establish compatibility with attitude control system.
- 4. Perform integrated tests with multiple instruments on common mount.
- 5. Evaluate calibration methods and accuracy of measurements.

JUSTIFICATION

Several oceanographic applications can be supported from accurate measurements of ocean surface temperatures; an IR radiometer has been specified as a means of making such measurements.

Prior to use of an IR radiometer for orbital measurements, the instrument must be integrated with laboratory and cooperating instrument systems.

INTERROLLI	BLE _	Yes	3		DURA	ATION (HR)	4		(ON TIME/CYCLE)
					NO. (
SUCCESSOR AND INITIAL	TASK N	IO. TIME	2.3	89, 0 hr					
NO.OF MEN				UPCTULE					
1	60	1	4	0	ELECTRICAL POWER	R0		wo	HR/CYCLE
1	66		4	0	0	_ HR FROM ST	ART OF C	YCLE	
1	67		4	0	SHIPPING WEIGHT _	20	LB	SHIPPING VOLUME	<u>0.5</u> FT ³
EQUIPMENT		ID			NAI	<u></u> МЕ			7
REQUIRED		11	IR I	Radiometer			·		1
		_		allation Kit					
	L								
				······································			····		_}
				······································			<u> </u>		
					System Int				
					System Int DURA				
INTERRUPTI	IBLE _	Yes	.			ATION (HR)	4		(ON TIME CYCLE)
INTERRUPTI	IBLE _ IOD (HF	Yes	8	-	DURA	ATION (HR)	4		(ON TIME CYCLE)
INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR	IBLE _ IOD (HE OR TAS TASK I	Yes R) SK NO. NO .	8	-	DURA	ATION (HR)	4		(ON TIME CYCLE)
INTERRUPTI CYCLE PERI PREDECESSO	IBLE _ IOD (HE OR TAS TASK I	Yes R) SK NO. NO .	8	39	DURA	ATION (HR)	4		(ON TIME CYCLE)
INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR	IBLE _ IOD (HF OR TAS TASK I LAG 1	Yes R) SK NO. TIME	8 12 25	39 7, 0.5 hr	DURA	ATION (HR)	4		(ON TIME CYCLE)
INTERRUPTION CYCLE PERIOD PREDECESSOR AND INITIAL	IBLE _ IOD (HF OR TAS TASK I LAG 1	Yes R) SK NO. NO. TIME	8 12 25	39 7, 0.5 hr	DURA NO. (ATION (HR) OF CYCLES	5		(ON TIME CYCLE)
OYCLE PERIPREDECESSOR SUCCESSOR AND INITIAL	IBLE _ IOD (HE OR TASK I LAG T	Yes R) SK NO. TIME	8 12 25	39 7, 0.5 hr HR FROM START OF CYCLE	DURA NO. (ATION (HR) OF CYCLES R20	5	W4	(ON TIME CYCLE)
CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN	IBLE _ IOD (HE OR TASK I LAG I	Yes R) SK NO. TIME	8 12 25 CCYCLE	39 7, 0.5 hr HR FROM START OF CYCLE 0	ELECTRICAL POWER	ATION (HR) OF CYCLES R 20 _ HR FROM ST	4 5 ART OF C	W4	(ON TIME CYCLE) HR/CYCLE
CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1	IBLE _ IOD (HE OR TASK I LAG I SKILL 60 66	Yes R) SK NO. TIME	8 12 25 (CYCLE 4 4	39 7, 0.5 hr HR FROM START OF CYCLE 0 0	ELECTRICAL POWER	ATION (HR) OF CYCLES R 20 _ HR FROM ST	4 5 ART OF C	W4	(ON TIME CYCLE) HR/CYCLE
CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1 EQUIPMENT	IBLE _ IOD (HE OR TASK I LAG I SKILL 60 66	Yes R) SK NO. TIME	8 12 25 (CYCLE 4 4	39 7, 0.5 hr HR FROM START OF CYCLE 0 0	ELECTRICAL POWER	ATION (HR) OF CYCLES R20 _ HR FROM ST	4 5 ART OF C	W4	(ON TIME CYCLE) HR/CYCLE
CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE _ IOD (HE OR TASK I LAG I SKILL 60 66	Yes	8 12 25 CCYCLE 4 4	39 7, 0.5 hr HR FROM START OF CYCLE 0 0	ELECTRICAL POWER O SHIPPING WEIGHT _	ATION (HR) OF CYCLES R20 _ HR FROM ST	4 5 ART OF C	W4	(ON TIME CYCLE) HR/CYCLE
CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1 EQUIPMENT	IBLE _ IOD (HE OR TASK I LAG I SKILL 60 66	Yes R) SK NO. TIME ID HR	8 12 25 CCYCLE 4 4 4	39 7, 0.5 hr HR FROM START OF CYCLE 0 0 0	ELECTRICAL POWER O SHIPPING WEIGHT NAI	ATION (HR) OF CYCLES R20 _ HR FROM ST	4 5 ART OF C	W4	(ON TIME CYCLE) HR/CYCLE
CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1 EQUIPMENT	IBLE _ IOD (HE OR TASK I LAG I SKILL 60 66	Yes R) SK NO. TIME ID HR ID 11	8 12 25 CCYCLE 4 4 4	39 7, 0.5 hr HR FROM START OF CYCLE 0 0	ELECTRICAL POWER O SHIPPING WEIGHT NAI	ATION (HR) OF CYCLES R20 _ HR FROM ST	4 5 ART OF C	W4	(ON TIME CYCLE) HR/CYCLE
CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1 1 EQUIPMENT	IBLE _ IOD (HE OR TASK I LAG I SKILL 60 66	Yes R) SK NO. TIME ID HR ID 11	8 12 25 CCYCLE 4 4 4	39 7, 0.5 hr HR FROM START OF CYCLE 0 0 0	ELECTRICAL POWER O SHIPPING WEIGHT NAI	ATION (HR) OF CYCLES R20 _ HR FROM ST	4 5 ART OF C	W4	(ON TIME CYCLE) HR/CYCLE

TITLE

System Integration Test of Polarimeter and Transponder Satellite as a System

LEVEL

System Integration Tests

DESCRIPTION

The polarimeter system will be installed and operated in accordance with all preestablished procedures for performance of subtasks. Data will be recorded which will be compared with known measurements to evaluate system performance.

Subtasks are the following:

- 1. Remote satellite launch electromechanical interface.
- 2. Effects on MORL attitude control system.
- 3. Retrieval system.
- 4. Evaluate remote satellite attitude control.
- 5. Test radar against surface transponder.
- 6. Test system over water of known salinity.
- 7. Test with surface radar.

JUSTIFICATION

Since several oceanographic applications require that measurements of salinity of the ocean surface be made, a polarimeter may be conveniently used to make such measurements. The polarimeter measures the shift in polarization of a transmitted S-band signal. This shift is related to surface conductivity and, therefore, salinity.

The polarimeter and transponder satellite system must be integrated with the laboratory and cooperating instrumentation prior to measurement performance tests.

TASK PARAMETERS

Test of Polarimeter and Transponder Satellite
as a System

INTERRUPTIBLE Yes DURATION (HR) 2 (ON TIME/CYCLE)

CYCLE PERIOD (HR) 3 NO. OF CYCLES 5

PREDECESSOR TASK NO. 201, 40, 243, 244,

SUCCESSOR TASK NO. 259, 0.5 hr
AND INITIAL LAG TIME

NO. OF MEN	SKILL ID	HR/CYCLE	HR FROM START OF CYCLE
1	60	2	0
1	66	2	0
1	67	2	0

ELECTRICAL POWER	100		W	2		HR/CYCLE
0	HR FROM STA	ART OF CYC	CLE			
SHIPPING WEIGHT	250	LB	SHIPPING	VOLUME _	4	FT ³

EQUIPMENT REQUIRED

ID	NAME
18	S-Band Polarimeter

TASK NO. 243 TITLE Alignment and Lock-On Procedures--S-Band Polarimeter Satellite Control and Display Subsystem

LEVEL Development Tests

DESCRIPTION

This task is performed on the controls and displays associated with the S-band polarimeter transponder satellite. It requires that the equipment operator conduct experiments to determine the performance of the polarimeter control and acquisition equipment.

The system will be operated in the MORL by a trained operator, who will perform a series of tests, using simulated targets, to evaluate the adequacy and/or limitations of the polarimeter control system. These tests will require the monitoring, under controlled conditions, of measurements of speed to acquire, information content at the display, lock-on indication and accuracy, and reacquisition time.

JUSTIFICATION

Since ocean surface salinity is a useful parameter in oceanographic applications, a requirement has been identified for monitoring surface salinity by examining the rotation in the plane of polarization of an S-band signal reflected from the ocean surface. Thus, the evaluation and testing of methods of aligning the system and acquiring the transponder signal is an implied task.

NO	124	3_		TITLE	Assen	nble P isplay	olarimet Subsyste	er Sa em	tellite	Control		
				ne								
	TASK N	10		, 0 hr								
NO. OF MEN 1 1	SKILL 60 66	5	R/CYCLE 4 4 4	HR FROM START OF CYCLE O O O	ELECTRICAL 0 SHIPPING WEI	н	R FROM STAF	RT OF C	YCLE			
EQUIPMENT	1		T								1	
REQUIRED		ID			·	NAME						
		18		Band Polarin cial Test Eq								
INTERRUPTI	BLE _	Y	es	TITLE	Polarim	eter Sa DURATI	ON (HR)	Contro 4	ol and	Display	Subsys (ON TIME	CYCLE)
PREDECESS(43	·	_ NO. OF	CYCLES	5				
SUCCESSOR AND INITIAL	TASK N	10.		42, 0 hr								
NO. OF MEN	SKILI	пПн	R/CYCLE	HR FROM START								
1	61	_	4	OF CYCLE 0			2.0					
1	62		4	0	ELECTRICAL					3	HR,	CYCLE/
							R FROM STAF				2	3
	<u></u>		-		SHIPPING WEI	GHI	<u> </u>	В	SHIPPII (See	NG VOLUME. 1234 and	140)	FT°
EQUIPMENT REQUIRED		ΙD				NAME		<u>.</u>]	
KEQUIKES	Ī	18	S-B	and Polarim	eter							
		_		get Simulato								
		_	1	cial Test Eq								
				•	-							

TITLE Methods of Automatic and Manual Tracking -- Polarimeter Transponder Satellite Antenna

LEVEL

Development Tests

DESCRIPTION

This task will be performed on the transponder antenna of the S-band polarimeter system. The task requires that the equipment operator conduct experiments to determine tracking accuracy and to evaluate tracking procedures. The polarimeter system will be operated on board MORL by a trained operator, who will perform a series of tests, using simulated targets, to evaluate the adequacy and/or limitations of the polarimeter system. These tests will require the monitoring, under controlled conditions, of measurements of speed to acquire, information content at the display, lock-on indication and accuracy, and reacquisition time.

JUSTIFICATION

Since ocean surface salinity is a useful parameter in oceanographic applications, a requirement has been identified for monitoring surface salinity by examining the rotation in the plane of polarization of an S-band signal reflected from the ocean surface. Thus, the evaluation and development of methods for tracking the transponder signal is an implied task.

NO. <u>244</u>	1			TITLE								
INTERRUPTI	BLE _		Zes_		Satellite	Antenn DURATIO	(HR)	4			(ON TIME CYCLE)	
CYCLE PERI	OD (HR)4	<u> </u>									
PREDECESSO	OR TAS	K NO.	40									
SUCCESSOR T			242	, 0.5 hr								
NO. OF MEN	SKILL	IDHR/	CYCLE	HR FROM START OF CYCLE								
1	61 62	1	4 4	0 0	ELECTRICAL POWER 20 W 3						HR/CYCLE	
										NG VOLUME	(See 140)	
EQUIPMENT REQUIRED		ID				NAME		<u>-</u>	···		7	
KEQOIKED		18 - -	Ta	Band Polarii rget Simulat ecial Test E	tor							

TITLE System Integration Tests of Monostatic and Bistatic Laser

LEVEL System Integration Test

DESCRIPTION

This task will be performed on the monostatic and bistatic laser and will include the following subtasks:

- 1. Remote satellite launch electromechanical interface.
- 2. Effects on MORL attitude control system.
- 3. Retrieval system.
- 4. Remote satellite attitude control evaluation.
- 5. Integrate laser transmitter and receiver into laboratory cooperative instrument system.

JUSTIFICATION

Since sea state is a parameter of interest in oceanographic applications, a requirement has been identified for measuring relative range to the ocean surface from the laboratory in order to derive ocean dynamics. A bistatic or monostatic laser radar may be a possible means of making these measurements. This task will evaluate the integration of the laser satellite receiver system with the laboratory and cooperative instruments.

TASK PARAMETERS

TITLE System Integration Test -- Monostatic and Bistatic

INTERRUPT	IBLE _		<u>es</u>			_ DURATION (HR)	4			(ON	TIME / CYCLE)
CYCLE PER	IOD (HR) _4				NO. OF CYCLES	5	_		,	7 010227
PREDECESS	OR TAS	K NO.	38,	40, 36, 247	<u>, 248, 61</u>	6, 617					
SUCCESSOR AND INITIAL			260	0.5 hr							
NO. OF MEN	 	ID HR	CYCLE	HR FROM START OF CYCLE							
1 1	60 66		4	0	ELECTRICAL	POWER		w	4		HR/CYCLE
1	67		4	Ō		HR FROM STAR					
					SHIPPING WEI	GHT <u> </u>	3	SHIPPI	NG VOLUME	_0_	
EQUIPMENT REQUIRED		ID				NAME				7	(See 1247)
		14	Li	dar						1	
	L										

TASK NO. 247 TITLE Alignment and Lock-On Procedures -- Bistatic Laser Remote Satellite Displays and Control Subsystem

LEVEL Development Tests

DESCRIPTION

This task is performed on the displays and control subsystem for the bistatic laser. It requires that the equipment operator conduct tests to determine the accuracy and effectiveness of procedures for acquiring and tracking targets. A target generator will be used to evaluate lock-on and target acquisition procedures for the radar. Successive target data will be presented to the operator, who will follow pre-established procedures to acquire and track the targets for specified time periods. Data for determining time to acquire, accuracy of tracking, and target handling capacity will be recorded.

JUSTIFICATION

Since sea state is a parameter of interest in oceanographic applications, a requirement has been identified for measuring relative range to the ocean surface from the laboratory in order to evaluate ocean dynamics. Consequently, a task has been specified for evaluating the alignment and target acquisition subsystem of the bistatic laser radar to establish the operational procedures and design performance.

NTERRUPTIBLE		es											_ (ON T	IME/CYCLE)
YCLE PERIOD (H														
PREDECESSOR TA														
UCCESSOR TASK		247	0 hr					 			· <u>-</u> .	· · · · · · · · · · · · · · · · · · ·		
NO. OF MEN SKIL	L ID HR/	CYCLE	HR FROM S OF CYC											
1 60 1 66 1 67	,	4 4 4	0 0 0			0		HR FROM	START OF	CYCL	E			HR/CYCLE
EQUIPMENT REQUIRED	ID						NAME						7	
	14	Lio La	lar ser Sate	ellite	e As									
NO. <u>247</u> NTERRUPTIBLE		s			A] Re	TASK F lignme emote	ARAME nt and Satell	TERS Lock- ite Dis	-On Pi plays l	and (Contr	ols S	ubsys _ (ON	TIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (H	IR)	s l			A] Re	TASK F lignme emote	ARAME nt and Satell	TERS Lock- ite Dis	-On Pi plays l	and (Contr	ols S	ubsys _ (ON	stem TIME/CYCLE
NTERRUPTIBLE	IR) ASK NO. NO	1 124			A] Re	TASK F lignme emote	ARAME nt and Satell	TERS Lock- ite Dis	-On Pi plays l	and (Contr	ols S	ubsys _ (ON	stem TIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK SUCCESSOR TASK AND INITIAL LAG NO. OF MEN SKIL	ASK NO. NO. TIME	1 124 24 /CYCLE	HR FROM	hr START	Al Re	TASK Flignme	PARAME ent and Satell DURAT	TERS Lock- ite Dis TON (HR) CYCLES	On Proplays	and	Contr	rols S	ubsy:	stem TIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG	ASK NO. NO. TIME	1 124 24	6, 0.5	hr START	Al Re	TASK Flignme emote	PARAME Int and Satell DURAT NO. OF	TERS Lock- ite Dis TON (HR) CYCLES HR FROM	On Piplays 1 3 50 START 0	and (Contr	ols S	ubsys _ (ON	stem TIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (HEPREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKIL 1 6	ASK NO. NO. TIME	1 124 24 /CYCLE	HR FROM	hr START	Al Re	TASK Flignme emote	PARAME Int and Satell DURAT NO. OF	TERS Lock- ite Dis TON (HR) CYCLES HR FROM O	On Piplays 1 3 50 START 0	and (Contr	ols S	ubsys _ (ON	stem TIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKIL 1 6	ASK NO. NO TIME L IDHR,	1 124 24 /CYCLE	HR FROM OF CYC	hr START	Al Re	TASK Flignme emote	PARAME Int and Satell DURAT NO. OF	TERS Lock- ite Dis TON (HR) CYCLES HR FROM O	On Piplays 1 3 50 START 0	and (Contr	ols S	ubsys _ (ON	stem TIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (HEPREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKIL 1 6	ASK NO. NO TIME L IDHR,	1 124 24 /CYCLE 1	HR FROM OF CYC	hr START CLE	All Re	TASK Flignme emote	PARAME Int and Satell DURAT NO. OF	TERS Lock- ite Dis TON (HR) CYCLES HR FROM O	On Piplays 1 3 50 START 0	and (Contr	ols S	ubsys _ (ON	stem TIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (HEPREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKIL 1 6	ASK NO. NO TIME L IDHR,	s 1 124 24 /CYCLE 1 Lid Ta:	HR FROM OF CYC	hr START CLE	All Re	TASK Flignme emote	PARAME Int and Satell DURAT NO. OF	TERS Lock- ite Dis TON (HR) CYCLES HR FROM O	On Piplays 1 3 50 START 0	and (Contr	ols S	ubsys _ (ON	stem TIME/CYCLE

Manual and Automatic Tracking -- Bistatic-Laser, Remote TITLE Satellite Receiver Antenna

LEVFI Development Test

DESCRIPTION

This task is proposed for remote satellite antenna for the bistatic laser. The remote satellite will be mounted and operated outside the orbiting laboratory. An instrumentation system will be used to monitor data from antenna angle measuring devices on the satellite. Antenna tracking capability will be evaluated with the aid of a signal simulator.

JUSTIFICATION

Sea state is a parameter useful to many oceanographic applications. A bistatic laser ranging system has been proposed as a system potentially useful in measuring this parameter; if this system is to be used, the tracking capability of the remote satellite antenna must be evaluated in the operational environment.

NO. <u>248</u>			TITLE	Tracking	Bistati	ic Las	er Remo	te Satelli	te Rece	eiver
INTERRUPTI	BLE	Yes		Antenna	DURATION (HE	5,	2		(ON TIME	CYCLE)
CYCLE PERI	OD (HR)	3			NO. OF CYCLE	ES	3			
PREDECESSO	OR TASK	NONo	one						·	
SUCCESSOR AND INITIAL	TASK NO LAG TIN	. <u>24</u> ME	6, 0.5 hr							
NO. OF MEN	SKILL I	HR/CYCL	E HR FROM START OF CYCLE							
1	61 62	2 2	0	ELECTRICAL	POWER2	0	W	11	HF	R/CYCLE
•	02	"			HR FRO					
				SHIPPING WEI	GHT <u>25</u>	LB	SHIP	PPING VOLUME	0.5 (See	FT ³ 1247)
EQUIPMENT REQUIRED		ID			NAME]	
KEQOMED		- s	idar ignal Simulat pecial Test E							

- -- COL LIPATED

TASK NO. 252 TITLE Design Evaluation and Approval Tests of Final Radar Equipment

LEVEL Design, Evaluation, and Approval Tests

DESCRIPTION

The system will be installed, checked out, and operated. Its performance will be measured by monitoring the signals received from fully instrumented, preprogrammed, surface-based targets. The data received by the MORL system and performance parameters, will be recorded. Data will be compared with those from the transponder program.

This task is to evaluate the capability of the system in achieving the objective measurements with specified resolution, accuracy, and appropriate coverage or range. Where different methods are to be compared, additional data will be recorded to allow a tradeoff analysis to be accomplished.

Subtasks are the following:

- 1. Test and calibration against known targets, using ground-based targets at known locations and of known characteristics.
- 2. Evaluation of accuracy of measurements.
- 3. Evaluation of resolution of data.
- 4. Determination of range of parameter coverage.
- 5. Determination of stability of operation.
- 6. Final test against instrumented sea surface.

JUSTIFICATION

Several applications require that the distance from the laboratory to the Earth's surface be measured. Radar provides a convenient means of making such measurements.

This task will be required to evaluate the ability of the complete instrument/laboratory system to make satisfactory measurements. System performance will be matched against design requirements. Satisfactory completion of these tests will constitute design approval and formal acceptance of the instrument for subsequent prototype operational use.

NO	252			TITLE	Design	n Evaluation of	Final Ra	adar Equip	nnent
INTERRUPT	IBLE	Ye	s			DURATION (HR)	0.5		(ON TIME/CYCLE)
CYCLE PERI	IOD (HR)		1.5	-		NO. OF CYCLES	20		
PREDECESSOR SUCCESSOR AND INITIAL	OR TASK Task no Lag tii	NO. VE	226 261	, 0 hr; 262,	500 hr; 26	53, 500 hr; 264 816, 819, 828	l, 500 hr		hr;
NO. OF MEN	SKILL II 62 71	+	CYCLE). 5). 5	HR FROM START OF CYCLE 0.25 0.25	0	POWER <u>1,030</u> HR FROM [.] STAF GHT <u>0</u> L	RT OF CYCLE		
EQUIPMENT REQUIRED	-	13	Rad	ar		NAME			

TASK NO. 253 TITLE Design Evaluation and Approval Test of Optical Driftmeter

LEVEL Design Evaluation and Approval Test

DESCRIPTION

This task will be performed on the finally configured optical driftmeter system and will include as a subtask testing against known targets (daylight only) and sea surface using instrumented reflecting surface points.

The system will be installed, checked out, and operated. Its performance will be measured by monitoring the signals received from fully instrumented, surface-based targets operating in a preprogrammed fashion. The data received by the MORL system and the performance parameters will be recorded. Data comparisons with the transponder program will furnish a method of comparing results.

The task is to evaluate the capability of the system in achieving the objective measurements with specified resolution, accuracy, and appropriate coverage or range. The elements of this task will include all subtasks associated with obtaining these data. Where different methods are to be compared, additional data will be recorded to allow a tradeoff analysis to be accomplished.

JUSTIFICATION

Since Tsunami warning information can be derived from accurate measurement of distance from the laboratory to the ocean surface, an optical driftmeter has been specified as a possible means of making such measurements.

This task will be required to evaluate the capability of the complete instrument/ laboratory system to obtain satisfactory measurements. Satisfactory completion of these tests will constitute design approval and formal acceptance of the optical driftmeter for subsequent prototype operational use.

NO	253				TITLE	Driftmete	valu a t r	10n an	nd Ap	opro	val T	estOp	tical	
								ON (HR)		1			(ON TIM	E/CYCLE)
CYCLE PERI	IOD (HR) 1	. 5				NO. OF	CYCLES.	1	0				
SUCCESSOR AND INITIAL	TASK N	NO												
NO. OF MEN	SKILL	ID HR.	/CYCLE	HR FROM OF CY										
1	61		1		0	ELECTRICAL P	OWER	5	500		W	1		HR/CVCLE
1	71		1		0			R FROM S						IIIV OTOLL
L	<u> </u>					SHIPPING WEIG	HT	0	_ LB		SHIPPI	NG VOLUME		<u>0</u> FT ³
EQUIPMENT REQUIRED		ID					NAME]	
NEQUILES.		-	Opti	cal Dr	iftmet	er								

TASK NO. 254 TITLE Design Evaluation and Approval Test of K-Band Profilometer

LEVEL Design Evaluation and Approval Test

DESCRIPTION

This task will be performed on the K-band profilometer system and will consist of the following subtasks:

- 1. Test and calibration against known targets.
- 2. Evaluation of performance against land-sea interface of known profile and contour.

The system will be installed, checked out, and operated. Its performance will be measured by monitoring the signals received from fully instrumented surface based targets which operate in a preprogrammed fashion. The data received by the MORL system and the performance parameters will be recorded. Data comparison with the transponder program will furnish a method of comparing results.

The task is to evaluate the capability of the system in achieving the objective measurements with specified resolution, accuracy, and appropriate coverage or range. The elements of this task will include all subtasks associated with obtaining these data. Where different methods are to be compared, additional data will be recorded to allow a tradeoff analysis to be accomplished.

JUSTIFICATION

Beaches and harbor information can be derived from ocean profile measurements, and a radar profilometer has been specified as a possible means of making such measurements.

The task will be required to determine whether the complete instrument/laboratory system can make acceptable measurements. System performance will be matched against design requirements. Satisfactory completion of this task will constitute both design approval and formal acceptance for subsequent prototype operations.

NO. 254		TITLE	Profilometer	tion and Ap	proval T	est – K	-Band	1
INTERRUPTIBLE .	Yes 1.5	5	DURATIO		10		(ON TIM	ME/CYCLE)
	NO. 279,		24 hr					
NO. OF MEN SKILL 1 62 71		E HR FROM START OF CYCLE O O	ELECTRICAL POWER HE	R FROM START OF	FCYCLE			
EQUIPMENT REQUIRED	ID Ra	dar Profilom	NAME					

TASK NO. 255 TITLE Design Evaluation and Approval Tests — Variable Focal Length, High-Speed, Large Format Camera

LEVEL Design Evaluation and Approval Test

DESCRIPTION

This task will be performed on the camera system and will consist of the following subtasks:

- 1. Test and calibration against known targets.
- 2. Test and comparison against simultaneous aircraft photography.

The camera system will be assembled in its final configuration and system evaluation tests will be performed. Its performance will be determined by measuring (photographing) surface areas of known characteristics and at known locations. The photographs will be developed and photogrammetric and/or sensitometric analysis made to obtain the required data. Comparison of the data with known parameter values will yield system performance data in terms of the resolution of the measurements, accuracy of the measurements, and the range of values obtained.

The instrument's capability to achieve measurement objectives can then be determined by comparison with desired values. Tradeoffs can be made among similar instruments.

JUSTIFICATION

Photographic techniques will be used to obtain information relating to sea state, shallow water characteristics of the ocean bottom, and certain phenomena associated with the shoreline interface. Areas of interest include the following:

- 1. Weather Forecasting Current boundaries and mass transport of sea water can be conveniently monitored through analyzing successive color photographs of dye markers placed in the current streams.
- 2. Fisheries Production
 - A. The concentration and distribution of sea surface plant life can be conveniently analyzed with color photographs by monitoring the color distribution.
 - B. Plankton concentration and distribution can be conveniently monitored by photographing the bioluminescence of the sea surface.
 - C. Distribution of fish stocks possibly can be monitored by comparing successive photographs of schooling species on the surface.
- 3. Waste Disposal and Pollution
 - A. Shallow water bottom contours in both the littoral and neritic zone can be studied with photogrammetric analyses of successive photographs.
 - B. The sedimentation rate and characteristics of the sea bottom can be analyzed photographically by the use of dyed sand and by analysis of successive photographs.
 - C. The character of the interface between fresh water and sea water can be analyzed by comparing successive color photographs.
- 4. Shipping and Navigation
 - A. The characteristics of surface currents that contribute to sea-state determination can be analyzed by photographically monitoring the position and motion of surface floats that act as current tags.
 - B. Shallow water subsurface hazards to shipping and navigation can be detected by photography using polarized light.

This task will evaluate the complete camera/laboratory system. Performance will be matched against design requirements. Satisfactory completion of these tests will constitute both design approval and formal acceptance of the camera for subsequent prototype operational use.

NO. <u>255</u>			TITLE	Design Evaluation and A	oproval Test -	- Camera
INTERRUPTI	BLE	es		DURATION (HR)	0.5	(ON TIME CYCLE)
				NO. OF CYCLES		
PREDECESSOR:						
AND INITIAL hr; 276, hr; 270,	720 h 720 h	r; 277, r	720 hr; 278.	720 hr; 272, 720 hr; 273, 7 , 720 hr; 281, 720 hr; 282,	20 hr; 274, 72 720 hr; 283,	20 hr; 275, 720 720 hr; 284, 720
1 1 1	60 66 67	0.5 0.5 0.5	0 0 0	ELECTRICAL POWER	F CYCLE	
EQUIPMENT REQUIRED	1		nera	NAME		

TITLE Design Evaluation and Approval Tests of Microwave Radiometers

LEVEL Design Evaluation and Approval Tests

DESCRIPTION

This task will be performed on the microwave radiometer subsystem and will consist of the following subtasks:

- 1. Determination of accuracy, resolution, and range against known surface temperatures and of path attenuation and refraction effects.
- 2. Combine with all components for final test.

This task will examine the performance capability of the final system in measuring surface temperature and temperature contrasts. Measurements obtained from the radiometer will be recorded and later compared with known values recorded on the surface over the same time intervals.

Simultaneously, data describing the characteristics of the atmosphere along the line of sight will be determined to isolate the effects caused by atmospheric attenuation. The data will be recorded and analyzed to determine resolution, accuracy, and range of measurements as an evaluation of instrument performance.

JUSTIFICATION

Since passive microwave radiation from the ocean's surface is useful in collecting data for oceanographic applications, monitoring of this radiation is required.

This task will evaluate the ability of the complete instrument/laboratory system to make satisfactory measurements. System performance will be matched against design requirements. Satisfactory completion of these tests will constitute design approval and formal acceptance of the instrument for subsequent prototype operational use.

NO	256	····		TITLE .	Design Evaluation an Radiometer	nd Approv	ral Test — Mi	crowave
INTERRUPTI	BLE		Yes		DURATION (HR)	1.5		(ON TIME/CYCLE)
							·	
PREDECESSO	OR TASK	NO	236					
SUCCESSOR T	TASK NO.	270,	720 hr; 2	271, 7	20 hr; 272, 720 hr; 285	, 720 hr;2	86, 720 hr;2	87, 720 hr;
AND INTITIAL	LAG IIM	288,	720 hr;2	89, 7	20 hr; 290, 720 hr; 801	01,81001	, 81201, 8250	01, 83001,
					81501, 82701, 83201,	81402, 82	902 all 0 hr.	
NO. OF MEN	SKILL ID	HR CYCLE	HR FROM S OF CYC					
1	67	0.5	1.0		ELECTRICAL POWER80	0	W1.5	HR/CYCLE
$\frac{1}{1}$	71	0.5	1.0		O HR FROM S	START OF CYC	LE	
					SHIPPING WEIGHTO	LB	SHIPPING VOLUME	0FT ³
EQUIPMENT		D		-	NAME			ן
REQUIRED	1	2 Mic	rowave :	Radio	meter		· · · · · · · · · · · · · · · · · · ·	1

LEVEL Design Evaluation and Approval Test

DESCRIPTION

Examine the performance capability of the final system in measuring surface temperature and temperature contrasts. Measurements obtained from the radiometer will be recorded and later compared with known values recorded on the surface over the same time intervals.

Simultaneously, data describing the characteristics of the atmosphere along the line of sight will be determined to isolate the effects caused by atmospheric attenuation. The data will be recorded and analyzed to determine resolution, accuracy and range of measurements as an evaluation of instrument performance.

This task consists of the following subtasks:

- 1. Determine accuracy, resolution, and range against known surface temperature path attenuation and refraction effects.
- 2. Evaluate minimum absorption window errors for several orbits against known integrated locations.
- 3. Evaluate O₃ absorption errors for several orbits against known integrated locations.
- 4. Combine with all components for final test.

JUSTIFICATION

Information can be derived from accurate measurement of sea surface temperature from the laboratory, and, therefore, an IR radiometer has been specified as a possible means of making such measurements.

This task will be required to evaluate the capability of the complete instrument/orbital laboratory system. System performance will be matched against design requirements. Satisfactory completion of these tests will constitute design approval and formal acceptance of the radiometer for subsequent applications.

NO. 25	7			TITLE	Design Ev	zaluatio	n and	Approva	al Te	st — IR R	adion	eter
INTERRUPTI CYCLE PERI PREDECESSO	OD (HR))	1.	5							ON TIME	/ CYCLE)
SUCCESSOR AND INITIAL	TASK N	0	270,	271, 272, 2 823, 834, 8					0 hr;	804, 808	, 811,	817,
NO. OF MEN	60 66 67		/CYCLE 1.5 1.5	HR FROM START OF CYCLE O O O	ELECTRICAL SHIPPING WEI	O HR	FROM STA	ART OF CYC	CLE			2
EQUIPMENT REQUIRED		1D 11	IR R	adiometer		NAME						

LEVEL Design Evaluation and Approval Tests

DESCRIPTION

This task will be performed on the S-band polarimeter system and will consist of the following subtasks:

- 1. Conduct salinity measurement of instrumented sea surface.
- 2. Determine coverage limitations.
- 3. Evaluate accuracy, resolution, calibration, and data reduction.

The system will be installed and operated to gather data from which sea surface salinity can be determined. The task will require that a transponder satellite be used to provide a retransmitted signal after receiving an interrogation signal from the MORL and after reflection off the sea surface. The polarization shift contains the information relating to conductivity and, therefore, surface salinity.

System performance will be measured by operating the system against a sea surface where the salinity is known. The data from the polarimeter will be recorded and will be used to evaluate the capability of the instrument to obtain measurements with acceptable values of resolution, accuracy, and range of salinity value.

JUSTIFICATION

Since oceanographic information can be derived from ocean salinity measurements, an S-band polarimeter has been specified as a possible means of making such measurements.

This task will evaluate the ability of the complete polarimeter/remote satellite/manned laboratory system to make satisfactory measurements of surface salinity. Performance will be evaluated against design requirements. Satisfactory completion of these tests will constitute design approval and formal acceptance of the instrument for subsequent prototype operational use.

NO. <u>259</u>				TITLE		valuatioi	n and Appr	oval les	t – Polari	meter
INTERRUPTI	BLE _	Ye	es			DURATION (HR)1.0		(ON T	TIME/CYCLE)
CYCLE PERI	OD (HF	R)	1.5			NO. OF CYC	LES10			
PREDECESSO	OR TAS	SK NO.	2	42						
SUCCESSOR AND INITIAL				70, 720 hr; 2 86, 720 hr; 2	<u>-</u>		20 hr; 276,			
NO. OF MEN	SKILL	ID HR.	/CYCLE	HR FROM START OF CYCLE						
1	62 71		1	0 0		<u>0</u> HR F	100 ROM START OF	CYCLE		
EQUIPMENT REQUIRED		ID				NAME				
KEĞOMED		18	S-Ba	and Polarimo	eter					

LEVEL Design Evaluation and Approval Test

DESCRIPTION

This task will be performed on the monostatic and bistatic laser ranging system (Lidar) and will consist of the following subtasks:

- 1. Determine atmospheric effects with instrument ground-based reflectors.
- 2. Determine day-night (sunlight) difference effects.
- 3. Determine refractive characteristics.
- 4. Repeat for both operating modes.

The laser system will operate in two modes — bistatic and monostatic. This task will evaluate the performance capability of the laser for both modes. This system will be used to measure and record range data to instrumented surface targets of known reflectivity for both the bistatic and monostatic modes.

The data will be compared to known values to establish the range, accuracy, and resolution of the measurements. Atmospheric effects will be evaluated by comparing data over various angles (with respect to vertical.)

JUSTIFICATION

86

Since sea state is a parameter of interest in oceanographic applications, a requirement has been identified for measuring relative range to the ocean surface from the laboratory to evaluate ocean dynamics.

This task will evaluate the capability of the complete laser/remote satellite receiver/manned laboratory complex to accurately determine sea state. Performance will be matched against design requirement specifications. Satisfactory completion of these tests will constitute design approval and formal acceptance of the instrument for subsequent prototype operational use.

NO. 260)			-	TITLE	~			and App ng Syste		– Bistat	i c an	d Mo	no-
INTERRUPT	BLE _	Y	es				DURATIO	ON (HR)		1.0		. (ON TI	ME/CY	(CLE)
CYCLE PERI	OD (HF	R)	1.5				NO.OF	CYCLES.						
PREDECESS	OR TAS	SK NO	2	46					14417					
SUCCESSOR AND INITIAL	TASK N LAG 1	NO. FIMF	291,	720 hr;	292,	720 hr;	80301,	0 hr;	81301,	0 hr;	82201,	0 hr;	8260	01,
0 hr; 83			hr	···										
NO. OF MEN	SKILL	. ID HF	R'CYCLE	HR FROM S OF CYC										
1	61		1	0		ELECTRICA	L POWER _	100	00	_ w	0	. 5	_HR/C	YCLE
<u>l</u> 1	62 71		1 1	0	İ	0	Н	R FROM:	START OF C	YCLE				
	11					SHIPPING W					ING VOLUM	Ε	0	_ F T 3
EQUIPMENT		ID			-		NAME				<u>-</u> .	7		
REQUIRED		14	Lic	lar										

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TASK NO. 261 TITLE Measure Relative Range to Determine Tsunami Wave Height

Relative to Sea Level Reference

LEVEL

Measurements

DESCRIPTION

Using a V/h meter and K-band radar, conduct a series of range measurements to detect and monitor Tsunami wave height. The computation of relative range from image motion rate will be performed and recorded and compared with corresponding radar data. These measurements are to be conducted with the ocean surface as a target to gather data on range, accuracy, and resolution under typical ocean conditions.

JUSTIFICATION

Tsunami wave height measurement is required for determining wave energy spectrum and energy transfer characteristics, which are important factors in developing Tsunami prediction and warning methods.

NO.	261					TITLE			of Relative	•	Tsunan	ıi W	ave
INTERR							_		N (HR)			(ON T	IME/CYCLE)
									YCLES				
PREDEC	CESSOR	: TAS	K NO.	252	, 253								
SUCCES:	SOR TA	ASK N .AG T	IO.	293,	0 hr					100000000000000000000000000000000000000			
NO. OF	MENS	KILL	ID HR	CYCLE	HR FROM OF CY								
1		67		1	0		ELECTRICAL	POWER	1030	W	1		_ HR/CYCLE
							0	НЕ	R FROM START C	F CYCLE			
		. = -					SHIPPING WE	IGHT	<u>0</u> LB	SHIPPIN	G VOLUME	0	FT ³
EQUIPM REQUIR			ID				<u> </u>	NAME					
NEQUIN	(LD		13	Rad V/h	ar Meter				•				

TITLE Measure Relative Range to Determine Change in Position of Tsunami Wave Maxima as a Function of Time

LEVEL

Measurements

DESCRIPTION

Conduct a series of radar relative range measurements to detect and monitor the position of Tsunami wave maxima as a function of time. These measurements are to be performed under typical ocean conditions to gather data on range, accuracy, and resolution. The data is to be recorded for future correlation with other measurements.

JUSTIFICATION

Tsunami wave direction in conjunction with the energy spectrum is an important measure of the propagation characteristics and, therefore, has important application for developing Tsunami prediction and warning methods.

NO. <u>262</u>	2		TITLE	Measure Relative Range -	– Tsunami	Wave History
				DURATION (HR)		(ON TIME/CYCLE)
CYCLE PER	IOD (HR)	1.5		NO. OF CYCLES	1 26	
PREDECESS	OR TASK	NO2	.52			
SUCCESSOR AND INITIAL	TASK NO Lag tin	. 294 ME	4, 0 hr			
NO. OF MEN	SKILL II	HR/CYCLE	HR FROM START OF CYCLE			
1	67	1	0.5	ELECTRICAL POWER1030	W	1.5 HR/CYCLE
				O HR FROM START OF		
<u></u>		<u></u>		SHIPPING WEIGHTO LB		VOLUMEO FT ³
EQUIPMENT REQUIRED		ID		NAME		
	1	3 Ra	da <i>r</i>			

TITLE Measure Relative Range for Wave Profile Determination

TASK NO. 263

Measurements

DESCRIPTION

LEVEL

Conduct a series of radar relative range measurements to monitor the sea surface height over a region comparable to a typical Tsunami wavelength. These measurements are to be performed over a variety of ocean regions to enhance the probability of encountering Tsunami phenomena. Data is to be gathered on range, accuracy, and resolution and is to be recorded for future correlation with other measurements.

JUSTIFICATION

Wave profile measurement is a factor in deriving wave velocity and energy transfer characteristics which are important factors in developing Tsunami prediction and warning methods.

NO 263		TITI F	Measure Relative Rar	nge — Wave Profile	Determina-
INTERRUPTIBLE.	Yes		DURATION (HR)		
PREDECESSOR TASK SUCCESSOR TASK AND INITIAL LAG	NO. 293,	52 0 hr			
NO. OF MEN SKIL		HR FROM START OF CYCLE 0.5	ELECTRICAL POWER1030 O HR FROM STA SHIPPING WEIGHTOL	RT OF CYCLE	2
EQUIPMENT REQUIRED	ID Ra	dar	NAME		

TITLE Measure Relative Range to Compare Sea Level with Shore Height in the Littoral Zone

LEVEL

Measurements

DESCRIPTION

Conduct a series of radar relative range measurements to determine the sea height in the littoral zone relative to a reference height on the shore. These measurements are to be performed under a variety of ocean conditions to gather data on range, accuracy, and resolution. The data is to be recorded for future correlation with other measurements.

JUSTIFICATION

Tidal sea height is an important parameter in predicting Tsunami effects and in evaluating energy transfer to shore as opposed to total energy content associated with Tsunami waves.

NO. 264			TITLE		e Relat l to Sho	ive Range – ore Height (- Littoral Tsunami	Sea Heig)	ht as
INTERRUPTIBLE .	Yе	S			DURATIO	N (HR)	1.5	(ON	TIME CYCLE)
CYCLE PERIOD (H	R)				NO. OF CYCLES			· 	,
PREDECESSOR TA	SK NO.	252							
SUCCESSOR TASK AND INITIAL LAG	NO. TIME -	295, 0 hr							
NO. OF MEN SKILI	LIDHR	CYCLE HR FROM OF CY							
1 67		0.5 1.0) E	LECTRICAL I	OWER	1,030	w	1,5	HR/CYCLE
				O HR FROM START O					
			S			<u>0</u> LB		VOLUME	FT ³
EQUIPMENT REQUIRED	ID	entanen.			NAME				
	13	Radar							

TITLE Measure Relative Range to Compare Shore Height to Sea Surface in the Neritic Zone

LEVEL

Measurement

DESCRIPTION

Conduct a series of radar relative range measurements to determine the sea height in the neritic zone relative to a reference height on the shore. The measurements are to be performed under a variety of ocean conditions to gather data on range, accuracy, and resolution. The data is to be recorded for future correlation with other measurements.

JUSTIFICATION

Tidal sea height is an important parameter in predicting Tsunami effects and in evaluating energy transfer to shore as opposed to total energy content associated with Tsunami waves.

NO. 265			TITLE		e Relative Ieight (Tsu		Neritic S	Sea Heigh	t vs.
INTERRUPTIBL					DURATION (HR)		1.5	(ON T	IME/CYCLE)
			1.5		NO. OF CYCLES		1 26		
PREDECESSOR	TASK N	o. <u>252</u>	2				 -		
SUCCESSOR TA	SK NO. AG TIME	295,	0 hr						
NO. OF MEN SI	KILL ID	IR/CYCLE	HR FROM START OF CYCLE						
1	67	0.5	1.0	ELECTRICAL	POWER	030	_ W	1.5	_ HR/CYCLE
					HR FROM				•
		<u>.</u>		SHIPPING WEI	GHT <u>0</u>	LB	SHIPPING	VOLUME	FT ³
EQUIPMENT REQUIRED	10				NAME				
KEQOINED	13	Ra	dar						
	į								

TASK NO. 266 TITLE Measure Relative Range to Compare Shore Height to Surface of the Sea in the Oceanic Zone

LEVEL Measurements

DESCRIPTION

Conduct a series of radar relative range measurements to determine the sea height in the oceanic zone relative to a reference height on the shore. These measurements are to be performed under a variety of ocean conditions to gather data on range, accuracy, and resolution. The data is to be recorded for future correlation with other measurements.

JUSTIFICATION

Tidal sea height is an important parameter in predicting Tsunami effects and in evaluating energy transfer to shore as opposed to total energy content associated with Tsunami waves.

NO	266				TIT! F	Measur posed t	re Rela o Shore	tive Rang e Height (ge — Od (Tsuna	ceani mi)	c Sea H	Ieigł	nt as Op-
												(ON T	IME/CYCLE)
						NO. OF CYCLES							
PREDECESSO	OR TASK	NO		252							,		
SUCCESSOR	TASK NO). .ić	295,	0 hr									
AND INITIAL	LAG III	ME	· · · · · · · · · · · · · · · · · · ·										<u> </u>
NO. OF MEN	SKILLI	DHR/	CYCLE	HR FROM S OF CYC		i							
1 67	67	67 0.5		1.0		ELECTRICAL	. POWER _	1030		N	1,	5	HR/CYCLE
						O HR FROM START C			r of cyc				
	:					SHIPPING WE	IGHT	0 LB		SHIPPIN	IG VOLUME		0 FT ³
EQUIPMENT						<u> </u>						٦	
REQUIRED	_	ID					NAME					4	
		13	Ra	adar									
	- 1		i									1	

267

TITLE Measure Relative Range to Determine Wave Amplitude Distribution over a Selected Area of the Sea Surface

LEVEL

Measurements

DESCRIPTION

Conduct a series of measurements of radar relative range and derive the amplitude variation over a selected region of the sea. These measurements are to be performed under a variety of ocean conditions to gather data on range, accuracy, and resolution. The data is to be recorded for future correlation with other measurements.

JUSTIFICATION

To separate Tsunami waves from the smaller scale perturbations in sea height, small-scale sea-state measurements are necessary so that the Tsunami wave can be treated as a slowly varying bias on this high-frequency phenomena.

				.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	, I E ! C ! C !				
No. <u>26</u>	7		TITLE		Relative Ra	inge – A	Amplitude	Distri	oution
INTERRUPTIBLE	<u>Y</u>	es		[OURATION (HR)		1.5	(ON -	TIME/CYCLE)
CYCLE PERIOD (HR)	1.5	- , ,	N	NO. OF CYCLES	126			
PREDECESSOR T.	ASK NO.	252							
SUCCESSOR TASK	K NO <u>.</u> G TIME	2	96, 0 hr						
NO. OF MEN SKIL	L ID HR	CYCLE	HR FROM START OF CYCLE						
1 6	7	0.5	1.0		OWER1,03C			1.5	HR/CYCLE
				SHIPPING WEIGH	HT0	LB	SHIPPING VO	LUME	<u> </u>
EQUIPMENT		1	·	***************************************	ALA MET				
REQUIRED	ID .	<u> </u>			NAME				
	13	Rac	lar						

TITLE Measure Relative Range to Determine Time Separation between Wave Maxima for a Particular Region of the Ocean Surface

LEVEL Measurements

DESCRIPTION

Conduct a series of measurements of radar relative range and derive the time variation over a selected region of the sea. These measurements are to be performed under a variety of ocean conditions to gather data on range, accuracy, and resolution. The data is to be recorded for future correlation with other measurements.

JUSTIFICATION

To separate Tsunami waves from the smaller scale perturbations in sea height, the small-scale sea-state measurements are required so that the Tsunami wave can be treated as a slowly varying bias on this high-frequency phenomena.

NO	268			TITLE		Relative Wave Max					
INTERRUPTIB	BLE			Yes		DURATION (HF	?>	1.5	((ON TIME	CYCLE)
CYCLE PERIO	D (HR)			1.5		NO. OF CYCLE	ES	126			
PREDECESSOR	PREDECESSOR TASK NO. 252			2 52							
SUCCESSOR TA	ASK NO. AG TIM	Æ		296, 01	n r					· · · · · · · · · · · · · · · · · · ·	
NO. OF MENS	SKILL II	DHR.	CYCLE	HR FROM START OF CYCLE							
1	67	(). 5	1.0	0	POWER HR FRO	M START OF	CYCLE			2
EQUIPMENT REQUIRED	 	ID 13	Rada	r	SHIPPING WEI	NAME	LB	SHIPPING	VOLUME	0	FT ~
	L										

Photographic Measurements to Determine Direc-

269 TASK NO.

TITLE

tion of Propagation and Evaluate Scale for

Wave Spectrum Determination

LEVEL.

Measurements

DESCRIPTION

Analyze photograph of a given region of the ocean surface to determine direction of propagation and to evaluate scale for the determination of wavelength and period. These measurements are to be performed by scaling the distance difference between crests on a single photograph and the distance moved by corresponding crests on successive photographs. The data is to be recorded for future correlation with other measurements.

JUSTIFICATION

The determination of sea state for Tsunami warning is based on wave phenomena and requires a measurement of wavelength, period, and direction of propagation of waves.

NO	26	9		TITLE	Photographic Measurements -	<u>– Wave</u>	Spectrum	(Tsunami)
INTERRUPTI	BLE _			Yes	DURATION (HR)	1.5	(ON T	IME/CYCLE)
CYCLE PERI	OD (HR)		1.5	NO. OF CYCLES	126		
PREDECESSO	OR TAS	K NO.		255				
SUCCESSOR AND INITIAL	TASK N LAG T	IO. —		296, 0	hr			
NO. OF MEN	SKILL	ID HR	CYCLE	HR FROM START OF CYCLE				
1 60		60 1.5		0	ELECTRICAL POWER100	_ W	0.25	_ HR/CYCLE
					O HR FROM START OF CY			
					SHIPPING WEIGHTO LB	SHIPPING	G VOLUME	<u>0</u> FT ³
EQUIPMENT REQUIRED	[ID			NAME			
		19	Can	nera				

Measure Color Concentration, Surface Salinity, and Surface
TITLE Temperature to Locate Water Masses of Particular Characteristics for Use with Fish Population History

Measure Color Concentration, Surface Salinity,

LEVEL

Measurements

DESCRIPTION

Monitor surface temperature and surface salinity with radiometric and polarimetric methods and measure surface color concentrations with photographic methods. Measurements will be recorded for correlation with information on the location and movement of fish species as a function of time.

JUSTIFICATION

Surface salinity and surface temperature data are important for direct correlation with fish stock history.

U			TITLE	and Temperature Water Mass Characte	eristics	
IBLE	<u>Y</u> e	s		DURATION (HR) 1	(ON TIME CYCLE)	
IOD (H	IR)	1.5	· .	NO. OF CYCLES126		
OR TA	SK NO.	256	6, 257, 259,	255		
TASK N LAG T	IO.	304, (0 hr			
SKIL	L ID HE	/CYCLE	HR FROM START OF CYCLE			
6	67 1		0	ELECTRICAL POWER 330 W 1	HR/CYCLE	
					O HR FROM START OF CYCLE	
<u> </u>				SHIPPING WEIGHTO LB SHIPPING VOLUME _	0FT ³	
	ID			NAME		
	11	IR	Radiometer			
	12	Mi	crowave Rad	iometer		
	18	S-	Band Polarin	neter		
	19	Ca	mera			
	TIBLE RIOD (H SOR TA TASK N LAG 1	TIBLE Ye RIOD (HR) SOR TASK NO. TASK NO. LAG TIME ID 11 12 18	TIBLE Yes 1.5	TIBLE Yes 1.5 1.5 256, 257, 259, 258 257, 259, 258 257, 259, 258 257, 259, 258 258 257, 259, 258	TASK NO. LAG TIME SKILL ID HR/CYCLE HR FROM START OF CYCLE	

Measure Sea Surface Color Concentration, Salinity, and ...
TITLE Temperature, and Correlate Data to Establish Favorable
Conditions for Plant Production

LEVEL Measurements

DESCRIPTION

Measure color concentration in ocean and correlate with known areas favorable to plant life. This measurement consists of taking color photographs of selected ocean areas and comparing areas of known plant life conditions by measuring the color differences as a possible basis for discerning regions most favorable to plant life. Ocean surface salinity and temperature measurements will be made concurrently with polarimetric and radiometric techniques.

JUSTIFICATION

The determination of regions in the ocean favorable to production of plant life is extremely important for fisheries production applications.

No. 271		TITLE	Measure Sea Surface Color, Salinity, and ture Favorable Conditions for Plant P	1 Tempera- roduction	
			DURATION (HR) 1.5	(ON TIME/CYCLE)	
			NO. OF CYCLES 126		
PREDECESSOR TAS	K NO	255, 256, 257,	259		
SUCCESSOR TASK N		02, 0 hr			
NO. OF MEN SKILL	. ID HR.	CYCLE HR FROM START OF CYCLE			
1 67	' 1	.5 0	ELECTRICAL POWER 330 W 1.5	HR/CYCLE	
			O HR FROM START OF CYCLE		
			SHIPPING WEIGHT O LB SHIPPING VOLUME	FT ³	
EQUIPMENT REQUIRED	ID		NAME]	
	11	IR Radiometer			
	12	Microwave Rad	liometer		
	18	S-Band Polarin	meter		
	19	Camera			

Measure Bioluminescence, Surface Salinity and Temperature, TITLE and Collate Data to Determine Favorable Conditions for Plankton Production

Measure Bioluminescence, Surface Salinity, and

LEVEL

Measurements

DESCRIPTION

Combine photographic, radiometric, and polarimetric information on bioluminescence, surface temperature, and surface salinity to derive information on plankton concentration (or mass numbers), which is related to the evaluation of favorable conditions for fisheries production. This task consists of making the measurements, then preprocessing and formatting the various measurements for inputting to the laboratory general purpose computer where correlation analysis will be conducted. Part of the photographic preprocessing for inputting the computer will be performed by laboratory personnel.

JUSTIFICATION

The determination of regions of the ocean favorable to production of plankton is extremely important for fisheries production applications.

No. 272			TITLE	Temperature Plankton Production	
INTERRUPTIBLE .	Ye	s		DURATION (HR) 1	(ON TIME/CYCLE)
CYCLE PERIOD (H	R)	1.5		NO. OF CYCLES <u>126</u>	
PREDECESSOR TA	SK NO.	255,	256, 257,	259	
SUCCESSOR TASK AND INITIAL LAG	NO. TIME	303,	0 hr		
NO. OF MEN SKILL	_ ID HR	/CYCLE	HR FROM START OF CYCLE		
1 67	7	1.0	0	ELECTRICAL POWER 330 W 1 O HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME	
EQUIPMENT REQUIRED	ID			NAME]
	11 12 18 19	Mic	Radiometer rowave Radi and Polarim nera		

TITLE Measure Predator Distribution, Surface Schooling of Species, and Track Tagged Species to Estimate Quantity and Determine Location and Movement as a Function of Time

LEVEL

Measurements

DESCRIPTION

Make high-resolution photographic measurements of the ocean surface in an attempt to locate and track surface schooling species. Successive high-resolution photographs of the ocean surface are to be visually examined by laboratory personnel, and data relative to the geographic location of possible schooling species is to be recorded for future comparison with data on plant life and color measurements.

JUSTIFICATION

In fisheries production, it is important to correlate food supply time history with fish stock population; therefore a task has been identified for estimating the location and movement of schooling species.

NO. <u>273</u>				TITLE	Measure Predator Distribution, Surface and Tagged Species (Fish Stock History)	Scho	oling,		
INTERRUPTII	BLE	Yes			DURATION (HR) 1	ON TIM	IE/CYCLE)		
CYCLE PERIO	OD (HR)	1.	. 5		NO. OF CYCLES 126				
PREDECESSO	R TASK	NO2	255	· · · · · · · · · · · · · · · · · · ·					
SUCCESSOR T AND INITIAL	ASK NO. LAG TIM	3 E	304,	0 hr					
NO. OF MEN	SKILL ID	HR CY	CLE	HR FROM START OF CYCLE					
1	67	1.	0	0	ELECTRICAL POWER 100 W 0.25		HR/CYCLE		
					O HR FROM START OF CYCLE				
					SHIPPING WEIGHT LB SHIPPING VOLUME _	0	FT ³		
EQUIPMENT REQUIRED		D			NAME				
]	19 (Cam	nera					

TITLE Photographically Measure Bottom Contours with Respect to Shore Reference

LEVEL

Measurements

DESCRIPTION

Make photographic measurements of contours in littoral and neritic zones. Comparison of high-resolution photographs with shore reference contours is to be made by laboratory personnel, and data denoting changes are to be recorded for future analysis.

JUSTIFICATION

These measurements are important for waste disposal and pollution applications because such measurements can be used to identify potential fill areas, to locate changing characteristics, and to identify potential causes of pollution.

NO. 274			TITLE	Photographically Measure Bottom Conton Disposal and Pollution)	urs (Waste
INTERRUPTIBLE _ CYCLE PERIOD (HI PREDECESSOR TASK	Ye R) SK NO. NO. _	s 1.5		DURATION (HR) 0.5 NO. OF CYCLES 126	(ON TIME/CYCLE)
NO. OF MEN SKILL	_ ID HR/		ROM START CYCLE O	ELECTRICAL POWER 100 W 0.25 0 HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME	HR/CYCLE
EQUIPMENT REQUIRED	19	Camera		NAME	

TITLE Photographically Measure Tagged Sediment Drift to Determine Rate and Character

LEVEL

Measurements

DESCRIPTION

Measure bottom sedimentation rate and character by photographically monitoring tagged sediment drifts. Successive high-resolution photographs of the ocean surface are to be visually examined by laboratory personnel, and data on sedimentation are to be recorded for future comparison with areas of sediment deposition.

JUSTIFICATION

These measurements are useful in determining mechanisms for deposition and for locating and identifying pollution sources.

NO. <u>275</u>			TITLE	Photographically Me (Waste Disposal and			ent Drift
INTERRUPTIBLE _	Yes			DURATION (HR) _	0.5		(ON TIME/CYCLE)
CYCLE PERIOD (HF	?)	1.5		NO. OF CYCLES _			
PREDECESSOR TAS	SK NO	255					
SUCCESSOR TASK		305,	0.5 hr				
NO. OF MEN SKILL	. ID HR/	CYCLE	HR FROM START OF CYCLE			***	
1 67		0.5	0	ELECTRICAL POWER 100 HR FROM S SHIPPING WEIGHT 0	START OF C	YCLE	
EQUIPMENT REQUIRED	1D 19	Car	mera	NAME	_ L.B	SHIPPING VOLUME	

TITLE Measure Color Contrast and Surface Salinity

LEVEL Measurements

DESCRIPTION

Measure color contrast and surface salinity in certain ocean regions using polarimetric and photographic methods. Color photographs and polarimetric measurements of salinity are to be made simultaneously over the same shoreline regions, and the data on color and the data on differences in salinity are to be recorded for future correlation with possible sources of polution.

The following are to be determined:

- 1. Character and change nature of interface.
- 2. Shoreline effects on pollution.
- 3. Surface isolation.
- 4. Development of methods of waste disposal.

JUSTIFICATION

The measurement of fresh-water/sea-water interface, the shoreline effects on pollution, and the isolation of sources of pollution are areas of application to which these measurements contribute.

NO. 276			TITLE	Measure Color and Salinity Fresh-Wa Interface (Waste Disposal and Pollution)	ter/Sea-Water
INTERRUPT				DURATION (HR)	
CYCLE PERI	IOD (HR)	1.5		NO. OF CYCLES 126	· (OIT TIME OTCLE)
PREDECESS					
SUCCESSOR 1	TASK NO. LAG TIM	306 IE	, 0 hr		
NO. OF MEN	SKILL II	DHR CYCLE	HR FROM START OF CYCLE		
1	67	0.5	0	ELECTRICAL POWER 200 W 0.25	HR'CYCLF
				O HR FROM START OF CYCLE	
				SHIPPING WEIGHT 0 LB SHIPPING VOLUME	$=$ 0 $=$ FT^3
EQUIPMENT REQUIRED]		Band Polarin	NAME neter	

TITLE Photographically Track Passive Tags to Determine Direction of Propagation of Surface Currents

LEVEL

Measurements

DESCRIPTION

Photographically monitor passive tag tracking devices to establish the direction of surface currents. Successive high-resolution photographs of tagged regions of the ocean surface are to be visually examined by laboratory personnel, and data on direction and location of ocean currents are to be derived and recorded for later correlation.

JUSTIFICATION

Direction of propagation is a factor in establishing sea state for shipping and navigation applications.

NO. 277				···	TITI F	Photographically Track Passive Tags — Son Current Direction (Shipping and Navigation)	
INTERRUPTIBLE Yes					<u>.</u>	DURATION (HR) 0.5 NO. OF CYCLES 126	(ON TIME/CYCLE)
NO. OF MEN	SKILL 67		CYCLE	HR FROM S OF CYC O		ELECTRICAL POWER 100 W 0.25 O HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME	•
EQUIPMENT REQUIRED		19	Ca	mera		NAME	

TITLE Photographically Measure Surface to Subsurface Contrasts

LEVEL Measurements

DESCRIPTION

Using polarized light photographic techniques, conduct measurements to determine surface to subsurface contrast for particular ocean regions. High-resolution polarized photography will be used to collect data on contrast values over particular ocean regions corresponding to important shipping lanes. This data will be recorded for later readout.

JUSTIFICATION

The detection of submerged objects and the plotting and tracking of hazardous conditions can be derived from such measurements.

NO2	78		TITLE	Photographic Contrasts (Si	ally Measu nip and Nav	re Surface igation)	to Subs	urface
INTERRUPTIBL	_E <u>Υ</u> ε	s		DURATIO	ON (HR) <u>0.5</u>		(0N	TIME/CYCLE)
CYCLE PERIOD) (HR)	l. 5		NO. OF (CYCLES <u>126</u>			
PREDECESSOR	TASK NO	255) 					
SUCCESSOR TA	SK NC AG TIME	309	, 0 hr					
NO. OF MEN SE	KILL ID HF	R/CYCLE	HR FROM START OF CYCLE					
1	60	0.5	0	ELECTRICAL POWER _	100 R FROM START OF		25	HR/CYCLE
			· · · · · · · · · · · · · · · · · · ·	SHIPPING WEIGHT			/OLUME	<u> </u>
EQUIPMENT REQUIRED	ID			NAME				
	19	Car	nera					

279

TITLE Measure Relative Range to Determine Sea Height and Wave Height in the Littoral Zone

LEVEL

Measurements

DESCRIPTION

The time history of the relative range data will be examined to determine if the time rates of range change are consistent with ocean surface dynamics. The stability of this data and the effects of high-frequency noise fluctuations will be evaluated to determine smoothing requirements for enhancing accuracy of sea-state measurement. The data will be smoothed by appropriate circuitry, and the smoothed values will be examined by laboratory personnel and also recorded for later readout.

JUSTIFICATION

This task is required to determine the effects of the sea state as it influences beaches and harbors.

NO. 279			TITLE	Measure Rela Height Lit	ative Range toral Zone (Sea I Beaches	Height an s and Hai	d Wave
INTERRUPTIBLE	(HR) TASK NO. K NO	Yes 1.5 254		NO. OF C	N (HR)1		(ON TIME/CYCLE)
NO. OF MEN SKI	LL ID HR	/CYCLE	HR FROM START OF CYCLE O	ELECTRICAL POWER H SHIPPING WEIGHT	R FROM START OF	CYCLE		2
EQUIPMENT REQUIRED	ID -	Rad	dar Profilom	NAME				

TASK'NO. 280

TITLE Measure Changes in Shoreline Topography to Determine Smallest Rate of Topographical Change to be Measured

LEVEL Measurements

DESCRIPTION

Measure change in shoreline topography, including man-made changes, by monitoring land-sea interface profile. Radar maps of the shoreline topography will be compared from orbit to orbit, and the changes will be noted and recorded to establish rate requirements for the measurement of topographical change.

JUSTIFICATION

Land-mass slumping and erosion information are important to beaches and harbors, and therefore a task has been identified to monitor this data.

NO	280_			TITLE	Measure Changes in Shoreline Topograph (Beaches and Harbors)	У
INTERRUPTI	BLE		Yes	··	DURATION (HR) 0. 5	(ON TIME CYCLE)
CYCLE PERI	OD (HR)		1.5		NO. OF CYCLES 126	
SUCCESSOR AND INITIAL	TASK NO LAG TII). ME	30	0,0 hr		
NO. OF MEN	SKILL	DHR/	CYCLE	HR FROM START OF CYCLE		
1	61	0.	25	0. 25	ELECTRICAL POWER 500 W 0.5	HR'CYCLE
·					O HR FROM START OF CYCLE	
					SHIPPING WEIGHT O LB SHIPPING VOLUME	FT ³
EQUIPMENT REQUIRED		D	n =		NAME	
		-	K-	Band Radar	Profilometer	

TITLE Measure Near-Shore Winds by Determining the Horizontal and Vertical Motion of Smoke

LEVEL

Measurements

DESCRIPTION

Near-shore winds will be measured by photographically monitoring the motion of smoke drift. Successive high-resolution photographs of near-shore smoke drifts will be visually examined by laboratory personnel, and wind motion will be noted and recorded for future analysis and readout.

JUSTIFICATION

Wind condition is a contributing factor in the evaluation of the effect of sea state and tides on beaches and harbors.

NO	281			TITLE	Photog: Smoke	raphica Drift (H	lly Meas Beaches a	ure N and H	ear-S arbo r	hore s)	Win	ds Using
INTERRUPTI	BLE _	7	Yes			_ DURATIO	N (HR)	0.	25		(0	ON TIME/CYCLE)
CYCLE PERI	OD (HR)	1.5			_ NO. OF C	YCLES	126				
PREDECESSO	OR TAS	K NO.	25	5								
SUCCESSOR AND INITIAL			No	ne								
NO. OF MEN	SKILL	ID HR	CYCLE	HR FROM START OF CYCLE								
1	60		0. 25	0	0	нг	100 R FROM STAR	COF CY	CLE			HR/CYCLE
EQUIPMENT REQUIRED		ID				NAME					_	
wegomen		19	Ca	mera								

TITLE Photographic Measurement of Sediment Drift to Determine Smallest Rate of Topographical Change To Be Measured

LEVEL

Measurements

DESCRIPTION

Using color photography, measure the change in man-made effects and shoreline sediment drift. High-resolution color photography of the shoreline topography will be compared from orbit to orbit, and the changes will be noted and recorded to establish rate requirements for the measurement of topographical change.

JUSTIFICATION

Shoreline erosion and buildup information is useful for beach and harbor applications. Color photography may be used to monitor these shoreline changes.

NO				TITLE	Photogr (Beache	aphic Moss and Ha	easuren arbors)	nent of S	Sediment	Drift		
INTERRUPTI	BLE _			Yes			DURATION (HR)		0. 25		(ON TIME CYCLE	
CYCLE PERI	OD (HR)			1. 5			NO. OF CYCL	ES	126		<u> </u>	
PREDECESSO												
SUCCESSOR AND INITIAL	TASK NO). ME -		300,	Ohr							
- INTIAL	LAG II	ME				·						
NO. OF MEN	SKILL I	D HR	CYCLE	HR FROM OF CY	I START 'CLE							
1	60	C	. 25	0		ELECTRICAL P	OWER	100	w	0, 25	HR	/CYCLE
							HR FR					, , , , , , ,
						SHIPPING WEIG				PING VOLUME	0	FT ³
EQUIPMENT		ID									1	
REQUIRED	F	ID					NAME				1	
		19	Ca	mera								
	J											

TITLE Photographically Monitor Movement of Dye Markers to Analyze Procedures to Select Minimum Sample Rates for

Current Boundaries and Mass Transport

LEVEL

Measurements

DESCRIPTION

Monitor movement of dye markers to establish dispersion rate so that photographic sample rates can be selected which are compatible with the desired accuracy. Successive color photographs of the ocean surface over special regions planted with dye markers will be examined by laboratory personnel, and dispersion rates will be estimated and recorded in order to evaluate photographic sample rates required.

JUSTIFICATION

The measurement of current boundaries and mass transport are useful in weather forecasting applications, and hence a requirement has been identified to monitor these effects by color photography and with dye markers on the ocean surface.

NO	283			TITLE .	Photographicall Current Bounda Forecasting)	ly Measur				
INTERRUPT	BLE	-	Yes		DURATION	DURATION (HR)		0. 25		CYCLE)
CYCLE PERI	OD (HR)		1.	5	NO. OF CY	CLES	126			
PREDECESS	OR TASK I	NO	255							
SUCCESSOR AND INITIAL			None							
NO. OF MEN	SKILL ID	HR CY		FROM START OF CYCLE						
1	60	0. 2	5	0	ELECTRICAL POWER HR			0. 25	HR/	'CYCLE
			*		SHIPPING WEIGHT			IG VOLUME	0	FT ³
EQUIPMENT REQUIRED		D			NAME]	
. Leganita		19	Came	ra						

TACK DADAMETEDS

TITLE Photographically Monitor Tagged Long-Shore Currents to Determine Dye Quantity and Effect of Dispersion

"LEVEL

Measurements

DESCRIPTION

Using color photography, monitor a given region of the ocean surface and measure the dispersion and spreading of dye markers in the ocean. Successive color photographs of the ocean surface over special regions planted with dye markers will be examined by laboratory personnel, and dispersion rates will be estimated and recorded in order to evaluate photographic sample rates required.

JUSTIFICATION

Since long-shore currents and littoral drift are important factors in determining the near-shore circulation, the measurement of dye dispersion is applicable for beaches and harbors.

NO	284	<u> </u>		TITLE				ure Tagged Harbors)	Long-Sho	ore
INTERRUP						. DURATIOI	N (HR)	0. 25	(ON	TIME/CYCLE)
CYCLE PEI	RIOD (HR)		1	. 5		NO. OF CYCLES		126		
PREDECES	SOR TASK	NO.	25	5						
SUCCESSOR AND INITIA			29	9,0 hr						
NO. OF ME	NSKILLI	DHR/	CYCLE	HR FROM START OF CYCLE						
1	60	(0. 25	0	ELECTRICAL	POWER	100	W	0. 25	HR/CYCLE
					0	HR	FROM START	OF CYCLE		
					SHIPPING WEI	GHT	O LB	SHIPPING	3 VOLUME	FT ³
EQUIPMEN REQUIRED	- 1	ID		<u>.</u>		NAME				
		19	Cam	era						
		1								

TITLE Simultaneously Measure Surface Temperature and Salinity for Diurnal Samples Over Same Areas

LEVEL

Measurements

DESCRIPTION

Conduct a series of radiometric and polarimetric measurements to determine surface temperature and salinity. Certain areas of the ocean visible during several orbits within a time span of approximately 48 hours will be monitored, and changes in radiometric and polarimetric data will be recorded and correlated to deduce information on diurnal changes in temperature and salinity.

JUSTIFICATION

Since diurnal changes in surface heating are a measure of the air/sea energy interchange, these measurements are important in weather forecasting.

Measure Surface Salinity and Temperature NO 285 TITLE Surface Heating (Weather Forecasting)									
INTERRUPTIBL				DURATION (HR)	0, 5		(ON TIME/CYCLE)		
CYCLE PERIOD	(HR) _		1. 5	NO. OF CYCLES	126				
PREDECESSOR	TASK	0	256 , 257 , 259)					
SUCCESSOR TA			301, 0 hr						
NO. OF MENSK	(ILL ID	HR CYCLI	HR FROM START OF CYCLE						
1	67	0. 5	0	ELECTRICAL POWER230 HR FROM	START OF CYCL	.E			
		·		SHIPPING WEIGHTO	LB	HIPPING VOLUME	0FT ³		
EQUIPMENT REQUIRED)		NAME					
KEQUIKED		2 M	Radiometer icrowave Rad Band Polarir						

TASK'NO. 286

TITLE Measure Surface Salinity and Temperature to Locate Areas of Nutrient Supply Due to Upwelling and Overturn

LEVEL

Measurements

DESCRIPTION

Monitor surface temperature and salinity changes by use of radiometric and polarimetric methods. Unusual changes in radiometric and polarimetric measurements will be recorded and correlated with information on regions favorable to plant life.

JUSTIFICATION

The supply of nutrients through upwelling and overturn is correlated with surface temperature and salinity changes. This data assists in the determination of favorable regions for plankton and hence fisheries production.

TASK PARAMETERS

NO		286	TITLE	Measure Surface Sa Areas of Nutrient S Production)			
				DURATION (HR)			(ON TIME/CYCLE)
CYCLE PERI	OD (HR)		1. 5	NO. OF CYCLES	12	26	
PREDECESSO	OR TASK I	NO256	6, 257, 259				
SUCCESSOR T			3, 0 hr				
						·	
NO. OF MEN	SKILL ID	HR/CYCLE	HR FROM START OF CYCLE				
1	67	1	0.5	ELECTRICAL POWER2:	30	W1.5	HR/CYCLE
				O HR FROM	START OF CYC	LE	
				SHIPPING WEIGHT0	LB	SHIPPING VOLUME	0 FT ³

EQUIPMENT REQUIRED

ID	NAME
11	IR Radiometer
12	Microwave Radiometer
18	S-Band Polarimeter

TITLE Measure Surface Temperature to Determine Influence of Neritic Currents on Waste Disposal

LEVEL Measurements

DESCRIPTION

Conduct radiometric measurements of surface temperature to determine surface current boundaries in the neritic zone. Radiometric data will be recorded and correlated with other data on surface current measurements taken over the same area at the same time.

JUSTIFICATION

The long- and short-term effects of ocean currents may be useful in developing methods for predicting pollution and methods for establishing the cause and control of pollution.

NO	287			TI^	ΓLE .	Measur (Waste	e Surfac Disposa	e Temper	ature ution)	Neritic	Currents
INTERRUPTI	BLE		Ye	5			_ DURATIO	N (HR)	0.5		(ON TIME/CYCLE)
CYCLE PERI	OD (HR)			1.5			_ NO. OF C	YCLES	126		
PREDECESSO	OR TASK	NO	25	ó , 257							
SUCCESSOR AND INITIAL			30	ó, 0 hr							
NO. OF MEN	SKILL I	DHR.	CYCLE	HR FROM STA	ART						
1	67	C), 5	0		0	HF	R FROM START (OF CYCLE		HR/CYCLE O FT ³
EQUIPMENT REQUIRED		ID					NAME]
KEQOMED		11 12	ı	Radiome crowave							

TASK'NO. 288

TITLE

Measure Surface Temperature and Salinity to Locate Water Masses of Particular Characteristics

LEVEL

Measurements

DESCRIPTION

Measure surface temperature and salinity and gather sufficient synoptic information along long-time samples to be used to predict dewpoint. Radiometric and polarimetric data will be recorded and correlated with other measurements to produce a long-term history of changes over geographical regions corresponding to important shipping lanes.

JUSTIFICATION

These measurements can be used to derive ocean dynamics and to locate areas of potential fog conditions and, therefore, are very useful in shipping and navigation.

TASK PARAMETERS

NO	288		TITLE		of Partic			ure Locate istics (Shipping
						1		(ON TIME CYCLE)
CYCLE PERI	IOD (HR)	1.5	5	NO. OF	CYCLES	1 26	-	
PREDECESS	OR TASK I	NO. <u>256</u>	, 257, 259					
SUCCESSOR AND INITIAL	TASK NO. LAG TIM	<u>308</u>	, 0 hr					
NO. OF MEN	SKILL ID	HR/CYCLE	HR FROM START OF CYCLE					
1	67	0.5	0, 5	ELECTRICAL POWER	230	w	1	HR/CYCLE

EQUIPMENT REQUIRED

ID	NAME
11 12 18	IR Radiometer Microwave Radiometer S-Band Polarimeter

SHIPPING WEIGHT _____

_ HR FROM START OF CYCLE

SHIPPING VOLUME ___O ___ FT³

TITLE Measure Temperature Contrast to Isolate Objects of Potential Hazard and Update Data to Improve Isolation and Tracking Ability

LEVEL Measurements

DESCRIPTION

Conduct temperature contrast measurements for locating floating objects, such as ships, icebergs, and debris. Radiometric data will be recorded, and unusual changes in temperature will be noted for communication to ground tracking stations for possible identification and confirmation. Potentially hazardous objects will be isolated by comparing data with other measurements.

JUSTIFICATION

Certain floating objects (such as icebergs) are a hazard to shipping and navigation. The location and tracking of such objects would contribute to safety.

NO.	289			TITLE	Measure Surface To Objects (Shipping and	emper nd Nav	ature -	- Locate F	loating
INTERRUPTII	BLE		Y	es	DURATION (HR	·	<u>l</u>	(
PREDECESSOR SUCCESSOR AND INITIAL	R TASK T <mark>ASK NO</mark>	NO)	256	255		·			
NO. OF MEN	SKILL I	 	O	HR FROM START OF CYCLE O	ELECTRICAL POWER	M START	OF CYCLE		
EQUIPMENT REQUIRED	1 '	ID 11 1 1 2		Radiometer Band Polarin	NAME neter				

TITLE Measure Surface Temperature to Determine Amount of Energy at Sea Surface (Long-Term Averages)

LEVEL

Measurements

DESCRIPTION

Conduct radiometric measurements to determine diurnal surface temperature variation. Certain areas of the ocean which are visible during several orbits within a time span of approximately 48 hours will be monitored, and changes in radiometric data will be recorded and correlated.

JUSTIFICATION

Since diurnal changes in surface heating are a measure of the air/sea energy interchange; radiometeric measurements are important in weather forecasting.

NO	290			TITLE	at Sea Su	Suriace rface (W	Tempe eather	rature - Forecas	- Detern ting)	nine Energ	У
INTERRUPT			Ye						•		
CYCLE PERI	OD (HR)			1. 5		NO. OF CYCLES 126					
PREDECESS	OR TASK	NO	25	6, 257							
SUCCESSOR AND INITIAL			30	1, 0 hr							
NO. OF MEN	SKILL II	DHR/	CYCLE	HR FROM START OF CYCLE							
1	67	C). 5	0	0	HR FRO	M START (OF CYCLE		HR/CY(
EQUIPMENT REQUIRED		ID				NAME]	
		11		Radiometer crowave Rad							

TITLE Measure Relative Range -- Perform Spectral Analysis to Determine Sea State

LEVEL

Measurements

DESCRIPTION

Conduct measurements of radar relative range with sufficient accuracy to estimate ocean dynamics. Derived spectral parameters, which are pertinent to sea-state description, shall be recorded for comparison with other weather forecasting data.

JUSTIFICATION

The amplitude distribution of wave height is an important measure of sea state which establishes ocean dynamics information critical in weather forecasting.

NO.	29	1		TITLE	Measure Sea State	Relative Ran Weather Fo	ge Spe recasting	ectral Ana g)	dysis for
									_ (ON TIME/CYCLE)
PREDECESS(
SUCCESSOR AND INITIAL	TASK N LAG T	O	Nor	ne					
NO. OF MEN	SKILL	ID HR	CYCLE	HR FROM START OF CYCLE					
1	67		1	0	0	HR FROM ST	ART OF CYCL	.E	HR/CYCLE ME 0 FT ³
EQUIPMENT REQUIRED		ID				NAME			
		14	Lic	lar					

TITLE Make Relative Range Measurements to Determine Sea State Along Shipping Lanes

LÊVEL

Measurements

DESCRIPTION

Collect Lidar data of sufficient content to generate a synoptic picture of sea-state conditions along shipping lanes. Data which are indicative of hazardous sea-state conditions will be noted and designated for immediate transmission to ground tracking stations.

JUSTIFICATION

The measurement and prediction of sea-state conditions are an important factor in locating hazardous sea conditions and in establishing the best routes for shipping and navigation.

NO2	92				TITLE	Measure Shipping	Rela Lane	tive R	Range	De	eterm	ine Se	a Stat	e A	long
							DURATION (HR) NO. OF CYCLES			_1			(ON TIME / CYCL		YCLE)
CYCLE PER													(0		
PREDECESS															
SUCCESSOR AND INITIAL	TASK N LAG T	IO. IME	307,	0 hr							•				
NO. OF MEN	SKILL	ID HR	/CYCLE	HR FROM S OF CYC	START LE										
1	62		1	0		ELECTRICAL O SHIPPING WEI	Н	R FROM	START (F CYCL	.E				YCLE FT ³
EQUIPMENT	·	ID					NAME]		
REQUIRED		14	Lid	ar											

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TASK NO.

293

TITLE

Monitor Tsunami Wave Height and Sea Height Over Tsunami Wavelength to Develop Data Processing to Determine Frequency and Amplitude Distribution

LEVEL

Phenomena to be Monitored

DESCRIPTION

In order to derive Tsunami wave-energy spectrum data, it is necessary to process the wave-height information by use of appropriate spectral analysis programs. Data processing methods for combining and weighting relevant Tsunami wave measurements require development.

Preprocessing of data and formatting for transmission to surface will be performed aboard the MORL. The wave-height data and the Tsunami profile data will be combined and filtered aboard the MORL. Data-point selection methods will be used as part of the preprocessing to reduce redundancy and, therefore, compact the data.

In addition, preliminary calculations of the wave-energy spectrum will be completed for immediate use in warning to endangered areas. More detailed analysis will be performed on surface ships where better computing facilities are available.

JUSTIFICATION

To develop predictive techniques for Tsunami warning, a requirement has been identified to provide information on Tsunami wave-energy spectrum.

NO	2	93	·		TITLE	Monitor Tsunami Wave Height and Sea Heig	ht
						DURATION (HR) 0. 5 (0. 5	
	OR TAS	K NO. O	261	, 263			
NO. OF MEN	SKILL 67 71		/CYCLE 0.5 0.5	HR FROM OF CY O	CLE	ELECTRICAL POWER 1.030 W 0.2 0.3 HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME _	
EQUIPMENT REQUIRED		1 3	Rad	dar		NAME	

TITLE Monitor Tsunami Propagation Speed to Derive Vector Velocity of Wave Front

LEVEL

Phenomena to be Monitored

DESCRIPTION

Develop data processing methods for deriving propagation direction and propagation velocity of wave front based on measured position of wave maxima and minima as a function of time. The radar range data will be preprocessed aboard MORL to extract speed and direction of Tsunami propagation to support the warning systems. To significantly reduce the data transmission problem, analysis of the data will be accomplished in real time, and the results will be formatted for transmission to the surface.

JUSTIFICATION

The derivation of Tsunami warning information requires the derivation of vector velocity of the Tsunami wave front.

NO	294 TITLE Monitor Tsunami Propagation Speed UPTIBLE No DURATION (HR) 0.5 (
INTERRUPTI	BLE _		N	0		_ DURATION (HR))	0.5		(ON TIME/CYCLE)	
CYCLE PERI	OD (HF	R)	0.	5		NO. OF CYCLE	s <u> </u>	4			
PREDECESSO	OR TAS	SK NO.	_ / _								
SUCCESSOR AND INITIAL			310	, 0 hr							
NO. OF MEN	SKILL	. ID HR	/CYCLE	HR FROM START OF CYCLE							
1	62		0.5		ELECTRICAL	POWER <u>1,03</u>	0	w	0.5	HR/CYCLE	
					0						
					SHIPPING WE	IGHTO	LB	SHIP	PING VOLUME	FT ³	
EQUIPMENT REQUIRED		ID				NAME					
NEQUILED.		13	Rad	ar							
	l		<u> </u>							اــا	

295

TITLE Monitor Synoptic Data on Sea Height Deviations From Normal Characteristics

LEVEL

Phenomena to be Monitored

DESCRIPTION

Synoptic tidal characteristics will be measured and catalogued to establish standards from which deviations from normal characteristics will yield changes due to Tsunami waves. This procedure will generally be performed automatically; however, data comparisons will be made periodically by laboratory personnel to ensure confidence in the data.

Data processing methods to calculate the deviation from mean sea height in the littoral zone, in the neritic zone, and in the oceanic zone will be developed.

JUSTIFICATION

In order to provide information on tidal sea height, it is necessary to monitor and calculate the deviation from normal sea height in the zones noted.

NO 2	295			TITLE	Monitor Synoptic Data Sea Height Dev From Normal	riation
INTERRUPTIE CYCLE PERIO PREDECESSO SUCCESSOR T	INTERRUPTIBLE CYCLE PERIOD (HR) PREDECESSOR TASK SUCCESSOR TASK NO AND INITIAL LAG TIM		Yes 1 26		DURATION (HR) 0.5 NO. OF CYCLES 5,840 (1 year)	
NO. OF MEN	SKILL I	+	CYCLE	HR FROM START OF CYCLE O	ELECTRICAL POWER 1,030 W 0.5 O HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUM	2
EQUIPMENT REQUIRED	-	1D 13	R	adar	NAME	

TASK'NO. 296

TITLE Monitor Wave Height and Period to Determine Spectral Distribution and Amplitude

LEVEL

Phenomena to be Monitored

DESCRIPTION

Using the measured information on wave height and wave period, data processing methods will be developed to calculate the amplitude spectral distribution of the ocean's surface. Sea-state calculations will be performed on board MORL because the information is needed to establish the existence of the Tsunami.

This task will require data analysis. Data will then be used to determine bias which may exist in the data. The bias terms will be used to confirm the existence of a Tsunami.

In addition, the same task will be required to assess the effects of the Tsunami wave as it approaches a shoreline. Sea-state measurements and computation will indicate the extent of expected damage.

JUSTIFICATION

The determination of Tsunami effects requires the monitoring of sea state so that Tsunami effects can be evaluated as bias terms on a rapidly fluctuating normal sea state.

NO	296		TITLE	Monitor Wa Spectral Dis		and Period	to Deter	mine
INTERRUPT	BLE	Yes	3	DUR	RATION (HR)	0.5		(ON TIME CYCLE)
CYCLE PERI	OD (HR)	1.5		NO.	OF CYCLES	10		
PREDECESS	OR TASK	NO. <u>26</u>	7, 268, 269					
SUCCESSOR AND INITIAL			l, 0 hr					
NO. OF MEN	SKILL ID	HR CYCLE	HR FROM START OF CYCLE					
1	67	0.5	0	ELECTRICAL POWE	ER <u>1,130</u>	w	0.5	HR/CYCLE
	71	0.5	0	0	HR FROM STA	ART OF CYCLE		
				SHIPPING WEIGHT.	0	LB SHIP	PING VOLUME	FT ³
EQUIPMENT REQUIRED	[]	D		NA	AME	.]

EQUIPMENT	
REQUIRED	

ID		NAME	
13 19	Radar Camera		

298

TITLE Monitor Sea and Wave Height in the Littoral Zone to Evaluate Sampling Methods

LEVEL

Phenomena to be Monitored

DESCRIPTION

Conduct experiments to evaluate optimum sampling rates and sampling methods for deriving wave height and sea height information in littoral zone, considering laboratory orbit constraints and the required speeds and accuracies of sampling. Evaluation of data-point selection methods and data collection methods will be required to establish optimum methods for continuous use.

JUSTIFICATION

Since severe information capacity limits may exist in the laboratory, it is essential that appropriate sampling methods which provide very large input data rates be developed and evaluated when phenomena are being monitored.

NO	298			TITLE	Monitor S	ea an	d Wave	Heigh	t in I	ittoral	Zone	
INTERRUPTII CYCLE PERIO PREDECESSOR SUCCESSOR AND INITIAL	OD (HR) OR TASI T <mark>ASK N</mark>) K NO O	1. 279	5	D						(ON TIME/	CYCLE)
NO. OF MEN	SKILL 62		CYCLE O. 5	HR FROM START OF CYCLE O	ELECTRICAL PO O SHIPPING WEIGH	н	R FROM ST	ART OF CY	CLE			
EQUIPMENT REQUIRED		1D -	K-B	and Radar F	Profilometer	NAME						

TASK NO:

299

TITLE Monitor Long-Shore Currents to Evaluate Sampling Methods

LEVEL

Phenomena to be Monitored

DESCRIPTION

Conduct experiments to evaluate optimum sampling rates and methods for long-shore currents, considering laboratory orbit constraints and the required speeds and accuracies of sampling.

JUSTIFICATION

Since severe information capacity limits may exist in the laboratory, it is essential that appropriate sampling methods which provide vary large input data rates be developed and evaluated when phenomena are being monitored.

NO	299			TITLI	Monitor Long-Shore Currents - Evaluate Sampling Method
INTERRUPT	IBLE _		Yе	S	DURATION (HR) 0. 25
CYCLE PER	IOD (HR	?)	1.	5	NO. OF CYCLES 100
PREDECESS	OR TAS	K NO.	2	84	
SUCCESSOR AND INITIAL			3	12, 0 hr	
NO. OF MEN	SKILL	IDHR	/CYCLE	HR FROM STAR	
1	62		0. 25	0	ELECTRICAL POWER 100 W 0.25 HR/CYCLE
	İ				O HR FROM START OF CYCLE
					SHIPPING WEIGHT O LB SHIPPING VOLUME O FT 3
EQUIPMENT REQUIRED		ID			NAME
•		19	С	amera	

LEVEL

300

Monitor Wave Reflection and Refraction, and Shoreline

Erosion and Buildup to Make a Land/Sea Interface Profile

Evaluation

Phenomena to be Monitored

DESCRIPTION

Collect data to evaluate changes in shoreline profile by correlating measured profiles against references.

This task requires analyses of radar profilometer and photographic data to perform change analyses to evaluate erosion and buildup of the shoreline. These results will be correlated with the sea state, wind state, and long-shore currents to examine the cause and to predict future trends.

JUSTIFICATION

Since shoreline morphology and breakwater, jetty, and groin data are significant for beach and harbor applications, task to evaluate the land/sea interface is required.

NO.	300			TITL	C1 1'	Monitor Wave Reflection and Refraction Shoreline Erosion and Buildup						
INTERRUPTI	BLE _									((ON TIME/CYCL	.E)
PREDECESSO	PREDECESSOR TASK NO. 280, 28 SUCCESSOR TASK NO. 312, 01			0, 282		NO. OF (_
AND INITIAL												
NO. OF MEN	SKILL	IDHR/	CYCLE	HR FROM STAR OF CYCLE	T 							
1	67		2	0		0 н	R FROM STA	RT OF CY	CLE		HR/CYC	
EQUIPMENT REQUIRED		ID				NAME						
	,	19	Ca	mera								

301

TITLE

Monitor Surface Heating (Diurnal Changes) and Incident Radiation to Analyze Heat Budget at Air/Sea Interface

LEVEL

Phenomena to be Monitored

DESCRIPTION

The derivation of data on the air/sea energy interchange requires an analysis of the surface temperature.

This task requires that raw data will be inserted in an on-board computer for preprocessing prior to transmission to the surface for detailed analysis.

JUSTIFICATION

Ocean surface heating and, in particular, diurnal changes in surface heating are important in weather forecasting since this data can be used to calculate the air/sea energy interchange.

NO30)1		TITLE	Monitor Surface Heating			
INTERRUPTIBLE				DURATION (HR)			(ON TIME/CYCLE)
CYCLE PERIOD (I	HR)	1. 5	5	NO. OF CYCLES	100		
PREDECESSOR T	ASK NO.	285	5, 290				
SUCCESSOR TASH		None					
NO. OF MEN SKIL	LL ID HR	/CYCLE F	R FROM START OF CYCLE				
		0.5 0.5 0.5		ELECTRICAL POWER230 OHR FROM START	HR/CYCLE		
				SHIPPING WEIGHT 0 LB		ING VOLUME	OFT ³
EQUIPMENT REQUIRED	ID			NAME			
	11 12 18	Mi	Radiomete crowave Ra Band Polar	adiometer			

LEVEL

302

TITLE Monitor Concentration (Mass Numbers) and Environmental Factors to Determine Synoptic Distribution of Areas Favorable to Plant-Life Production

Phenomena to be Monitored

DESCRIPTION

Develop methods to identify and display areas of the ocean favorable to plant-production based on concentration (mass numbers) and the measured environmental factors.

The data will be preprocessed to isolate and identify favorable areas, and the results reformatted for transmission to surface. This task will require special processing devices for geographic plots on board MORL. Change analysis will be used to further reduce data redundancy.

JUSTIFICATION

The determination of regions in the ocean which are favorable to production of plant life is extremely important for application to increase fisheries' production.

NO.	30	2		TITLE		Plant C				Inviron	mental	
INTERRUPTION CYCLE PERIOR	BLE _ OD (HR OR TAS) K NO.	Yes 24 27	1		DURATION NO. OF CY	(HR)	1 365			(ON TIME	/ CYCLE)
NO. OF MEN	LAG I	ID HR/		LID EDOM STADT	ELECTRICAL O SHIPPING WE	HR F	ROM STAR	T OF CY	CLE			
EQUIPMENT REQUIRED		11 12 18 19	Mi S-	Radiometer Icrowave Ra Band Polari Imera	diometer	NAME						

TITLE

Monitor Concentration (Mass Numbers), Environmental Factors, Osmotic Balance, and Supply of Nutrients Due to Upwelling and Overturn to Determine Conditions for Plankton Production

LEVEL Phenomena to be Monitored
DESCRIPTION

Combine measurements on bioluminescence, surface temperature and salinity; and combine the factors derived from correlating this information to predict favorable conditions for the production of plankton. The data will be preprocessed and reformatted for transmission to the surface. A general purpose computer will be used to accomplish this task as an off-line function. Data-point selection methods will be used.

JUSTIFICATION

The determination of ocean regions favorable to production of plant life is extremely important for applications to increase fisheries' production.

NO3	03			Т	ITLE	Monitor (Plankton			Osmo	otic Ba	lance,	Etc.	
INTERRUPTIE	BLE _		Yes				_ DURATIO	ON (HR)	1			(ON T	ME/CYCLE)
CYCLE PERIO	OD (HR)	24				_ NO. OF (CYCLES	365				
PREDECESSO	R TAS	K NO.	272	, 286									
SUCCESSOR T	ASK N	0 IME	314	, 0.5 h	r			-				-	
NO. OF MEN	SKILL	ID HR/	CYCLE	HR FROM ST OF CYCL									
1	67		L	0		ELECTRICAL O		330 R FROM STA			<u>l</u>		_ HR/CYCLE
				_		SHIPPING WE					NG VOLUME		0 FT ³
EQUIPMENT REQUIRED	ſ	ID					NAME					7	
VEĞOUVED		11 12 18 19	Mic S-E	Radiome crowave Band Pol nera	Rad	diometer							

TITLE

Monitor Fish Population and Distribution (Time, Location) to Determine Synoptic Distribution of Surface Observed Fish Stock History

LEVEL

DESCRIPTION

Combine all data pertinent to determine fish-stock location in order to provide a synoptic display of fish-stock movement. The data will be preprocessed and formatted for transmission to ground locations where detailed analysis will be performed. A general purpose computer operating off-line will be used for this task.

JUSTIFICATION

In fisheries' production, it is important to correlate food-supply history with fishstock population; therefore, a task has been identified to estimate the location and movement of schooling species.

NO	30	4		TITLE	Monitor Fish Population and Distribution	
INTERRUPTI	BLE		Yes	5	DURATION (HR) 1	(ON TIME/CYCLE)
CYCLE PERI	OD (HR)		24		NO. OF CYCLES 365	
PREDECESSO	OR TASK	NO	270	, 273		<u> </u>
SUCCESSOR AND INITIAL			315	6, 0.5 hr		
NO. OF MEN	SKILL I	DHR	CYCLE	HR FROM START OF CYCLE		
1	67		1	0	ELECTRICAL POWER 330 W 1	HR/CYCLE
			İ		O HR FROM START OF CYCLE	_
					SHIPPING WEIGHT O LB SHIPPING VOLUME	OFT ³
EQUIPMENT REQUIRED		ID			NAME]
		11 12 18 19	Mic S-E	Radiometer rowave Rac Band Polarir mera		

TITLE

Monitor Bottom Contours in Littoral and Neritic Zones; Monitor Bottom Sedimentation to Determine Trends in Changing Bottom Characteristics to Predict Future History

LEVEL Phenomena to be Monitored

DESCRIPTION

Combine data on bottom contours and sediment deposition to determine bottom characteristics and to predict future time history of bottom topography in critical areas. Data preprocessing will be accomplished aboard the MORL for detection of changes. This highly reduced data and the raw data will be formatted and transmitted to the ground periodically for further analysis.

JUSTIFICATION

These measurements are important for waste disposal and pollution applications because the measurements can be used to identify potential fill areas, locate changing characteristics, and identify potential causes of pollution.

NO	3	05		TITLE	Monitor Bottom Contours and Sedimentar	tion
INTERRUPTI CYCLE PERI PREDECESSO	OD (HR		2,	190	DURATION (HR) 2 NO. OF CYCLES 8	
SUCCESSOR TAND INITIAL	TASK N	10		6,0 hr		
NO. OF MEN	SKILL	ID HR.	/CYCLE	HR FROM START OF CYCLE		
1	67		2	0	ELECTRICAL POWER 100 W 1 O HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUM	
EQUIPMENT REQUIRED	[ID			NAME	
		19	Ca	mera		

306

TITLE Monitor Fresh-Water/Sea-Water Interface

LEVEL

Phenomena to be monitored

DESCRIPTION

Correlate data on currents with reference data on regions of pollution. The data will be analyzed aboard the MORL to discover the nature of the near shore-water motion process and to analyze the motion of currents. The preprocessed data will be transmitted to the ground for detailed analysis after formatting.

JUSTIFICATION

This data can assist in determining the degree to which currents can be used to avoid pollution, and the degree to which currents cause and control pollution.

NO3	06			TITLE	Monitor Fr	esh-Wa	<u>ter/Sea-</u>	<u>Water Ir</u>	<u>nterface</u>	
INTERRUPTI	BLE _	Y	es		DU	IRATION (H	R)1			(ON TIME/CYCLE)
CYCLE PERI	OD (HR) _3		A	NC	OF CYCL	ES <u>12</u>			
PREDECESSO	R TAS	K NO.	27	6, 287						
SUCCESSOR AND INITIAL			31	6,0 hr						
NO. OF MEN	SKILL	ID HR	CYCLE	HR FROM START OF CYCLE						
1 6		7 1		0	ELECTRICAL PO	1	HR/CYCLE			
					SHIPPING WEIGHT				IG VOLUME	OFT ³
EQUIPMENT REQUIRED		ID				NAME				
WE GOINGS		12 18	Micı	adiometer rowave Radi and Polarim era						

TITLE Monitor Surface Currents and Wave Height (To Generate Synoptic Picture of Sea-State Conditions)

LEVEL

Phenomena to be Monitored

DESCRIPTION

Combine data on wave height, wave period, and surface currents to establish a set of indicators of sea state which can be synoptically displayed.

The data will be processed continuously aboard the MORL to maintain synoptic information on sea state. Change analysis will be conducted, and the changes communicated to ground stations on a near real-time basis as a contribution to shipping and navigation aids.

JUSTIFICATION

The measurement and prediction of sea state is an important factor in locating hazardous sea conditions and in establishing best routes for shipping and navigation.

NO. 307				TITLE	Monitor Surface Currents and Wave Height - Synoptic Sea State			
					DURATION (HR) <u>0.5</u> (ON	(ON TIME/CYCLE)		
CYCLE PERIO	OD (HR)		1.5		NO. OF CYCLES <u>5, 840</u>			
PREDECESSO	R TASI	K NO	277,	292				
SUCCESSOR T			317,	0 hr				
NO. OF MEN	SKILL	IDHR/	CYCLE	HR FROM START OF CYCLE				
1	67		0.5	0	ELECTRICAL POWER 1, 100 W 0.5 HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING VOLUME			
EQUIPMENT REQUIRED		ID 14 19	Lid Car	lar mera	NAME			

TITLE Monitor Surface Current Boundaries to Locate Areas of Potential Fog Conditions

LEVEL

Phenomena to be Monitored

DESCRIPTION

Combine all data on surface current boundaries (from surface temperature and surface salinity) to determine the presence of conditions on the ocean surface which may produce fog conditions. The data will be preprocessed aboard the MORL and a fog warning message transmitted to the ground.

JUSTIFICATION

These measurements can be used to derive ocean dynamics and to locate areas of potential fog conditions and are, therefore, useful in shipping and navigation.

NO. <u>308</u>				TITLE	Monitor Surface (Locate Potential				
INTERRUPTIE	BLE		Yes		DURATION (HR) 0.25		(ON T	IME/CYCLE)
CYCLE PERIC	D (HR)		1.5		NO. OF CYC				
PREDECESSO	R TASK	NO.	288						
SUCCESSOR T			317, () hr					
NO. OF MEN	SKILL I	DHR	CYCLE	HR FROM START OF CYCLE					
1	66	(0.25	0	ELECTRICAL POWER	330	W	0.25	_ HR/CYCLE
					OHR F	ROM START OF	CYCLE		
					SHIPPING WEIGHT	<u>0</u> LB	SHIPPING	VOLUME	<u>0</u> FΤ ³
EQUIPMENT	Γ	ID		 	NAME	•			
REQUIRED		11 12 18	Mic	Radiometer rowave Rac and Polarin					

Monitor Submerged and Floating Objects (Ships,

309 TITLE Icebergs, Debris) to Plot and Track

Hazardous Conditions

LEVEL

TASK NO.

Phenomena to be Monitored

DESCRIPTION

Combine data on all submerged and floating objects detected to produce a composite indication of potentially hazardous conditions. A continuous plot of all hazardous objects will be maintained aboard the MORL. Change data will be transmitted to the ground for data updating and for subsequent use by ships at sea.

JUSTIFICATION

The detection of submerged objects and the plotting and tracking of hazardous conditions can be derived from such measurements.

NO. <u>309</u>				TITLE		Submerge ardous Co			jects —	
INTERRUPTI	BLE _		Yes		<u> </u>	_ DURATION (H	R)	0.25	(ON	TIME / CYCLE)
PREDECESSO										
SUCCESSOR T			317,	0 hr						
NO. OF MEN	SKILL	ID HR.	/CYCLE	HR FROM START OF CYCLE						
1	67		0.25	0	ELECTRICAL	POWER	230	W	0.25	HR/CYCLE
					0	HR FRC	M START OF	CYCLE		
					SHIPPING WE	IGHT <u>O</u>	LB	SHIPPING	VOLUME	0 FT ³
EQUIPMENT	[T		<u></u>		·			
REQUIRED		ID				NAME				
		11 12 19	Mic	Radiometer rowave Rad nera	liometer					

TITLE Assist in the Development of Predictive Techniques for Tsunami Forecasting and Warning

LEVEL

Specific Application Areas

DESCRIPTION

Develop techniques to analyze all information on the various phenomena monitored to provide an effective practical basis for Tsunami forecasting and warning. The preprocessed Tsunami wave-energy spectrum information and the Tsunami wave-direction information will be formatted and transmitted to the surface. Detailed data processing of this information and the raw-data information will be performed at ground stations to develop predictive techniques and improved methods of Tsunami warning and forecasting.

JUSTIFICATION

To develop predictive techniques for Tsunami warning applications, a requirement has been identified for integrating the data provided by the measured phenomena into a data processing program based on a predictive analytical model.

NO. <u>310</u>			TITLE	Develop Tsunami Predictive Techniques
INTERRUPTI	BLE	Yes		DURATION (HR) 1 (ON TIME/CYCLE)
CYCLE PERI	OD (HR)	_2		NO. OF CYCLES 24
PREDECESSO	OR TASK	No. <u>293</u>	3, 294	
SUCCESSOR AND INITIAL			ne	
NO. OF MEN	SKILL I	DHR/CYCL	HR FROM START OF CYCLE	
1 1	66 71	1 1	0	ELECTRICAL POWER 1,030 W 1.0 HR/CYCLE O HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME 0 FT ³
EQUIPMENT REQUIRED		ID Ra	adar	NAME

TASK'NO. 311 TITLE Assist in the Evaluation of Tsunami Predictive Techniques

LEVEL Specific Applications Area

DESCRIPTION

Compare Tsunami effect prediction, based on laboratory measurements, with known sea states and tidal effects to validate the predictive techniques developed. The preprocessed information for tidal sea height, for sea state, and for bottom photography will be combined into a formatted message and transmitted to ground stations for further processing. Ground processing will analyze the effects of Tsunamis on shorelines to improve predictive methods.

JUSTIFICATION

To evaluate Tsunami predictions, it is necessary to monitor and calculate the deviation from normal sea height in the various zones and to validate these calculations by comparison with known sea states.

NO. 311				TITLE	Evaluate	Tsunami I	Prediction	n			
INTERRUPT	IBLE _	Yes	i			DURATION (HR)	<u></u>	1	<u>l</u>	(ON TIME/	CYCLE)
CYCLE PERI	IOD (HF	R) <u>1</u>	. 5			NO. OF CYCLES	S	24	1		
PREDECESS	OR TAS	SK NO.	295	, 296		···	·		7.1		
SUCCESSOR AND INITIAL			Non	e							
NO. OF MEN	SKILL	. IDHR	/CYCLE	HR FROM START OF CYCLE							
1	66		1	0	ELECTRICAL	POWER	1,130	_ w	1	HR/	'CYCLE
						HR FROM					
<u></u>					SHIPPING WEI	GHT <u>O</u>	LB	SHIPPING	G VOLUME	0	FT ³
EQUIPMENT REQUIRED		ID				NAME					
		13 19		dar mera							

Assist in the Development and Evaluation of Predictive Techniques Describing Shoreline Processes

LEVEL

Specific Application Area

DESCRIPTION

Combine pertinent data on sea state, tides, wind state, littoral drift, shoreline morphology, breakwaters, jetties and groins to derive the predictive programs and the orbit requirements to achieve optimum coverage.

Preprocessed information regarding sea state, tide state, wind state, littoral drift, shoreline morphology, breakwater, jetty and groin data will be combined into a single formatted message for telemetry to the surface. On the surface, detailed computer programs will derive predictive methods and analytical methods for determining the effects of the shoreline processes on beaches and harbors.

JUSTIFICATION

Since severe information capacity limits may exist in the laboratory, it is essential that appropriate sampling and data collation methods be developed and evaluated when phenomena are being monitored which provide very large input data rates.

NO. 312				TITLE	Development and Ev Shoreline Processes		n of Pred	ictive	Techniques -
INTERRUPTI	BLE	Yes	5		DURATION (HR)	2		(ON TIME / CYCLE)
CYCLE PERI	OD (HR)	16	8		NO. OF CYCLES	52			
PREDECESSO	OR TASK	(NO.	298	, 299, 300	. *- 100	 			
SUCCESSOR				None					
AND INITIAL	LAG TI	IME							
NO. OF MEN	SKILL I	IDHR	CYCLE	HR FROM START OF CYCLE					
1	67		2	0	ELECTRICAL POWER	100	W	_1	HR/CYCLE
				;	O HR FROM	START OF	CYCLE		
					SHIPPING WEIGHTO	_ LB	SHIPPING	VOLUME _	0FT ³
EQUIPMENT	٦		1						
REQUIRED	-	ID			NAME				
		19	Ca	mera					

313 Develop Methods to Determine the History of Plant TASK NO. Concentration over the Ocean's Surface

LEVEL Specific Applications Area

DESCRIPTION

Correlate all data pertinent to plant production and develop methods for locating and determining the time history of plant concentration over the ocean's surface. Preprocessed information regarding location and distribution of surface sea plants will be transmitted to the surface for further detailed analysis and maintenance of synoptic plots of surface plant concentration and their motion.

JUSTIFICATION

The determination of regions in the ocean which are favorable to production of plant life is extremely important for applications to fisheries' production.

NO. <u>313</u>				TITLE	Determine History of Plant Concentration							
INTERRUPTI	BLE _	Yes				DURATION (HR)	1	(ON	TIME/CYCLE)		
CYCLE PERI	OD (HR)		4			NO. OF CYCLE		365				
AND INITIAL			None									
NO. OF MEN	SKILL	ID HR.	CYCLE H	R FROM START OF CYCLE								
1	67		1	0	ELECTRICAL P	OWER	330	w	1	HR/CYCLE		
		İ			0	HR FRO	M START OF	CYCLE				
					SHIPPING WEIG	HT0	LB	SHIPPING	VOLUME	<u> </u>		
EQUIPMENT REQUIRED		ID				NAME						
		11 12 18 19	Micr	adiometer owave Rad nd Polarir era								

TASK NO. 314 TITLE Determine Methods of Locating Plankton or Recognizing Conditions Favorable to the Presence of Plankton

Oddations 1 avolumes to the second

LEVEL Specific Application Area

DESCRIPTION

Correlate and analyze all data associated with the presence of plankton or conditions favorable to the production of plankton and develop procedures to locate and determine the history of plankton concentration over the ocean's surface.

Preprocessed information regarding location and distribution of plankton will be transmitted to the surface for further detailed analysis and maintenance of synoptic plots of plankton production and their motion.

JUSTIFICATION

The determination of regions in the ocean favorable to production of plankton is extremely important for applications to fisheries' production.

NO	314	4		TITLE	Locate Plankton					
INTERRUPTI	BLE _	Yes			DURATION (HR) _		1		(ON TIME/C	YCLE)
CYCLE PERI	OD (HR) 24			NO. OF CYCLES.		365			
SUCCESSOR T			ne							
NO. OF MEN	SKILL	ID HR/	CYCLE	HR FROM START OF CYCLE						
1 67		67 1		0	ELECTRICAL POWER	330	_ W	1	HR/(CYCLE
					O HR FROM					
					SHIPPING WEIGHTO	LB	SHIPPING	3 VOLUME	0	_ FT ³
EQUIPMENT REQUIRED		ID			NAME]	
WEGOWED		11 12 18 19	Mi S-	Radiometer crowave Rad Band Polarin mera	diometer	ene en acción de la companya de la c				

315

TITLE Study the History of Fish Species Movements

.TEAET

Specific Applications Area

DESCRIPTION

Correlate all data pertinent to the distribution of fish stock and develop analytical programs to determine the history of fish movement. The information regarding location and distribution of fish stocks, which resulted from processing information relating to the observance of schooling of specific species, their distribution, and their quantity, will be transmitted to the surface. On the surface, synoptic plots of fish stocks, their motion, and their history will be maintained.

JUSTIFICATION

In fisheries' production, it is important to correlate food-supply history with fishstock population, and therefore a task has been identified to estimate the location and movement of schooling species.

NO	31	5		TITLE	History of	Fish Spe	ecies Mo	ovement			
INTERRUPT	IBLE _	Yes	5		DU	IRATION (HR)		1	(ON TIME	CYCLE)
CYCLE PER	IOD (HR	(1)	24		NO	. OF CYCLES	s	365	·		
PREDECESS	OR TAS	K NO.	304	······································							
SUCCESSOR AND INITIAL				e					····		
NO. OF MEN	SKILL	ID HR	/CYCLE	HR FROM START OF CYCLE							
1	67		1	0	ELECTRICAL POW	/ER	330	w	1	HF	R/CYCLE
į					0						
					SHIPPING WEIGHT	0	LB	SHIPPING	VOLUME _	0	FT ³
EQUIPMENT REQUIRED	_	ID			1	IAME					
		11 12 18 19	Mi S-I	Radiometer crowave Rad Band Polarin mera							

TITLE Analyze The Causes of Existing Pollution; Identify Future Pollution Problems and Potential Solutions

LEVEL

Specific Application Area

DESCRIPTION

Correlate and analyze data to determine causes of existing pollution; to identify future pollution problems, and to detail the limitation on industrial and population growth caused by these pollution problems. Bottom topographic information and near-shore information will be preprocessed on board the MORL and will be transmitted to the surface. On the surface, detailed data analysis will be used to determine influences on waste disposal and pollution as affected by both bottom topography and near-shore currents.

JUSTIFICATION

This investigation is important for waste disposal and pollution applications because resulting data can be used to identify potential fill areas, locate changing characteristics, and identify potential causes of pollution.

INTERRUPTIBLE _	Yes () 16 () K NO	8 305, 306	Analyze the Causes of Existing Pollution DURATION (HR) 1 NO. OF CYCLES 52	
NO. OF MEN SKILL	. IDHR	CYCLE HR FROM START OF CYCLE 1 0	ELECTRICAL POWER330W1O HR FROM START OF CYCLE SHIPPING WEIGHTO LB SHIPPING VOLUME	2
EQUIPMENT REQUIRED	11 12 18 19	IR Radiometer Microwave Ra S-Band Polari Camera	diometer	

TITLE Establish Favorable Shipping Routes Considering Sea State, Ocean Dynamics, and Hazards

LEVEL

Specific Applications Area

DESCRIPTION

Combine all data pertinent to sea-state measurements, ocean dynamics, and hazards; derive methods to locate and forecast best routes, locate hazards, and provide warning of impending conditions of danger. Preprocessed information regarding ocean hazards to navigation, ocean dynamics and synoptic distribution of sea-state conditions will be combined and transmitted to the surface. On the surface, detailed analysis will be performed to maintain synoptic plots of hazards for locating and forecasting best shipping routes, to generate warning networks, and to create data for general improvements in ship design.

JUSTIFICATION

The measurement and prediction of sea state is an important factor in locating hazardous sea conditions and in establishing best routes for shipping and navigation.

NO			317	TITLE	Establish Favorable Shipping Routes
INTERRUPTI	BLE _		Yes		DURATION (HR) O. 5 (ON TIME/CYCLE
CYCLE PERI	OD (HR	!)	1.5		NO. OF CYCLES 5, 840
PREDECESS	OR TAS	K NO.	307	, 308, 309	
SUCCESSOR 1 AND INITIAL			Non	e	
NO. OF MEN	SKILL	ID HR.	/CYCLE	HR FROM START OF CYCLE	
1	67		0.5	0	ELECTRICAL POWER1330 W 0.5 HR/CYCLE
					O HR FROM START OF CYCLE
					SHIPPING WEIGHT O LB SHIPPING VOLUME O FT
EQUIPMENT REQUIRED	ſ	ID			NAME
vEĞOIVED		11 12 14 18	Mi Li S-	Radiometer crowave Ra dar Band Polari mera	diometer

NTERRUPTIBLE		Yes		DURATION (HR)	4	(ON TIME / CYCLE)
CYCLE PERIOD (H				NO. OF CYCLES		
PREDECESSOR TA						
UCCESSOR TASK IND INITIAL LAG	NO. TIME		501, 0 h	r		
NO. OF MEN SKIL	L ID HR	CYCLE	HR FROM START OF CYCLE			
1 60 1 7	ó 2	4 4	0 .0	ELECTRICAL POWER250 0 HR FROM STAI		4 HR/CYCLE
				SHIPPING WEIGHT1.5 L	_B SHIPPING	VOLUME <u>0.08</u> FT
EQUIPMENT REQUIRED	ID	÷		NAME		
	-	Mis	cellaneous	Test Equipment		
INTERRUPTIBLE			Yes	IR and UV Detectors -	4	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD(H	IR)		Yes 120		4	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (F PREDECESSOR TA	IR) NSK NO.	· · · · · · · · · · · · · · · · · · ·	Yes 120 1501	DURATION (HR) NO. OF CYCLES	4	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD(H	IR) ASK NO. NO	· · · · · · · · · · · · · · · · · · ·	Yes 120 1501	DURATION (HR) NO. OF CYCLES	4	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (F PREDECESSOR TA SUCCESSOR TASK	IR) ASK NO. NO TIME		Yes 120 1501	DURATION (HR) NO. OF CYCLES	4	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG	ASK NO. TIME L ID HR		Yes 120 1501 1601, 0 hr	DURATION (HR) NO. OF CYCLES	4 72 	(ON TIME / CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK SUCCESSOR TASK AND INITIAL LAG NO. OF MEN SKIL 1 6	ASK NO. TIME L ID HR	/CYCLE	Yes 120 1501 1601, 0 hr HR FROM START OF CYCLE	DURATION (HR) NO. OF CYCLES	4 72 W ART OF CYCLE LB SHIPPING	(ON TIME / CYCLE 1 HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKIL 1 6 1 7 EQUIPMENT	ASK NO. TIME L ID HR	/CYCLE	Yes 120 1501 1601, 0 hr HR FROM START OF CYCLE	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 100 118 HR FROM STA	4 72 W ART OF CYCLE LB SHIPPING	(ON TIME / CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKIL 1 6 1 7	ASK NO. TIME L ID HR	/CYCLE	Yes 120 1501 1601, 0 hr HR FROM START OF CYCLE	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 100118 HR FROM STA SHIPPING WEIGHT 0	4 72 W ART OF CYCLE LB SHIPPING	(ON TIME / CYCLE 1 HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKIL 1 6 1 7 EQUIPMENT	ASK NO. TIME L ID HR	/CYCLE	Yes 120 1501 1601, 0 hr HR FROM START OF CYCLE	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 100118 HR FROM STA SHIPPING WEIGHT 0	4 72 W ART OF CYCLE LB SHIPPING	(ON TIME / CYCLE 1 HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKIL 1 6 1 7 EQUIPMENT	ASK NO. TIME L ID HR	/CYCLE	Yes 120 1501 1601, 0 hr HR FROM START OF CYCLE	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 100118 HR FROM STA SHIPPING WEIGHT 0	4 72 W ART OF CYCLE LB SHIPPING	(ON TIME / CYCLE

TASK NO. 502 TITLE Effects of Space Environment on Radiometer Windows and Lens Coatings. Further Research on Propagation of Microwaves and Millimeter Waves Through the Upper Atmosphere.

LEVEL Applied Research for Design Data

DESCRIPTION

The effects of space environment on the properties of lens coatings and windows, which are employed in a microwave radiometer, will be determined. Several modular samples will be exposed to the space environment outside the laboratory. The samples will be inspected and tested periodically by returning them to the laboratory interior. Materials will be examined for deterioration or changes. Auxiliary equipment required will include a test module mounting kit, a microwave signal generator and evaluator test set, and a magnifying viewer.

JUSTIFICATION

This task applies to antennas on a microwave radiometer used to measure atmospheric temperature. When dielectric lenses are used as a means of focusing energy on microwave antennas, the properties of the lenses, their windows, and coatings differ from those used at visible frequencies.

This task is required to determine the adequacy of potential microwave radiometer lenses and window systems after exposure to a space environment.

Further research on propagation of microwaves and millimeter waves through the upper atmosphere is required, particularly where this instrument may be used from a synchronous orbit at great ranges from the phenomena being measured. To the present time, little research has been done on the propagation of energy at these frequencies and over large distances in the space environment.

		Install Experiment	rackage	
INTERRUPTIBLE		DURATION (HR)		(ON TIME/CYCLE)
CYCLE PERIOD (HR)	4	NO. OF CYCLES	2	
PREDECESSOR TASK NO.				
SUCCESSOR TASK NO AND INITIAL LAG TIME	502, 0 h	r		
NO. OF MEN SKILL ID HR/CYCLE	HR FROM START OF CYCLE			
1 66 4	0	ELECTRICAL POWER2	250 W 4	HR/CYCLE
1 72 4	0	O HR FROM STAR		
		SHIPPING WEIGHT LE		0.2 FT ³
EQUIPMENT ID				<u> </u>
REQUIRED ID		NAME		
- Mi	scellaneous T	est Equipment		
				ĺ
<u> </u>]
		Efforts of Survey D.		
			D 11	****
NO. <u>502</u>	TITLE	and Coatings	nment on Radiomet	er Windows
NO502 INTERRUPTIBLE	TITLE	and Coatings		
INTERRUPTIBLE	Yes	and Coatings DURATION(HR)	4	(ON TIME / CYCLE)
INTERRUPTIBLE	Yes	and Coatings	4	(ON TIME / CYCLE)
CYCLE PERIOD (HR) PREDECESSOR TASK NO SUCCESSOR TASK NO.	TiTLE Yes 120 1502	and Coatings DURATION(HR)	72	(ON TIME / CYCLE)
CYCLE PERIOD (HR) PREDECESSOR TASK NO	TiTLE Yes 120 1502	and Coatings DURATION (HR) NO. OF CYCLES	72	(ON TIME / CYCLE)
CYCLE PERIOD (HR) PREDECESSOR TASK NO SUCCESSOR TASK NOAND INITIAL LAG TIME	TiTLE Yes 120 1502 18, 0 hr	and Coatings DURATION (HR) NO. OF CYCLES	72	(ON TIME / CYCLE)
CYCLE PERIOD (HR) PREDECESSOR TASK NO. SUCCESSOR TASK NO. AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYCLE	TITLE Yes 120 1502 18, 0 hr HR FROM START OF CYCLE	and Coatings DURATION (HR) NO. OF CYCLES	72	(ON TIME / CYCLE)
CYCLE PERIOD (HR) PREDECESSOR TASK NO SUCCESSOR TASK NOAND INITIAL LAG TIME	TITLE Yes 120 1502 18, 0 hr HR FROM START OF CYCLE	and Coatings DURATION (HR) NO. OF CYCLES	72	(ON TIME / CYCLE)
CYCLE PERIOD (HR) PREDECESSOR TASK NO. SUCCESSOR TASK NO. AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYCLE 1 66 4	TITLE Yes 120 1502 18, 0 hr HR FROM START OF CYCLE 0	and Coatings DURATION (HR) NO. OF CYCLES	4 72 0 W 1	(ON TIME / CYCLE)
CYCLE PERIOD (HR) PREDECESSOR TASK NO. SUCCESSOR TASK NO. AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYCLE 1 66 4 1 71 4	TITLE Yes 120 1502 18, Ohr HR FROM START OF CYCLE 0	and Coatings DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 2	4 72 72 1 T OF CYCLE	(ON TIME / CYCLE) HR/CYCLE O FT ³
CYCLE PERIOD (HR) PREDECESSOR TASK NO. SUCCESSOR TASK NO. AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYCLE 1 66 4 1 71 4 EQUIPMENT ID	TITLE Yes 120 1502 18, Ohr HR FROM START OF CYCLE 0	and Coatings DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 2 118 HR FROM STAR	4 72 O W 1 T OF CYCLE S SHIPPING VOLUME	(ON TIME / CYCLE) HR/CYCLE O FT ³
CYCLE PERIOD (HR) PREDECESSOR TASK NO. SUCCESSOR TASK NO. AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYCLE 1 66 4 1 71 4	TITLE Yes 120 1502 18, Ohr HR FROM START OF CYCLE 0 0	and Coatings DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 2 118 HR FROM STAR SHIPPING WEIGHT O LE	4 72 O W 1 T OF CYCLE S SHIPPING VOLUME	(ON TIME / CYCLE) HR/CYCLE O FT ³
CYCLE PERIOD (HR) PREDECESSOR TASK NO. SUCCESSOR TASK NO. AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYCLE 1 66 4 1 71 4 EQUIPMENT ID	TITLE Yes 120 1502 18, Ohr HR FROM START OF CYCLE 0 0	and Coatings DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 2 118 HR FROM STAR SHIPPING WEIGHT O LE	4 72 O W 1 T OF CYCLE S SHIPPING VOLUME	(ON TIME / CYCLE) HR/CYCLE O FT ³
CYCLE PERIOD (HR) PREDECESSOR TASK NO. SUCCESSOR TASK NO. AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYCLE 1 66 4 1 71 4 EQUIPMENT ID	TITLE Yes 120 1502 18, Ohr HR FROM START OF CYCLE 0 0	and Coatings DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 2 118 HR FROM STAR SHIPPING WEIGHT O LE	4 72 O W 1 T OF CYCLE S SHIPPING VOLUME	(ON TIME / CYCLE) HR/CYCLE O FT ³
CYCLE PERIOD (HR) PREDECESSOR TASK NO. SUCCESSOR TASK NO. AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYCLE 1 66 4 1 71 4 EQUIPMENT ID	TITLE Yes 120 1502 18, Ohr HR FROM START OF CYCLE 0 0	and Coatings DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 2 118 HR FROM STAR SHIPPING WEIGHT O LE	4 72 O W 1 T OF CYCLE S SHIPPING VOLUME	(ON TIME / CYCLE) HR/CYCLE O FT ³

TASK NO. 504 TITLE Zero-G Effects on Lubricants for Internal Bearings

LEVEL Applied Research for Design Data

DESCRIPTION

The purpose of the test is to determine the retention of the lubricant material under zero-g conditions. Delicate or critical moving parts of instruments (spectrometers, telescopes, antennas, etc.) employing precision movements will require constant lubrication. By testing various lubricants inside the laboratory, a comprehensive analysis of zero-g effects can be obtained.

Exposure time will be for a period that will provide acceptable statistical values. Lubricants will be applied to bearings representative of the sleeve, pivot, cylindrical, ball or flat surface types, made of various materials. These lubricants will vary in chemical and physical properties as required.

The test procedure will consist of comparing the coefficient of friction of the test item after exposure to the value obtained previously on Earth. Bearings will be tested in the orbiting laboratory prior to exposure and after exposure. Gauls and other surface defects could be noted. Coefficient of friction and viscosity measurements will be determined by direct standard testing of the lubricant. A simple motor-driven test module will be employed to drive the bearings during evaluation tests.

Evaluating the bearing lubrication test early in the orbiting flight is important because the integrity of many mechanical movements will require confirmation.

Auxiliary equipment will include bearing surface tester, viscosity determination instruments, coefficient of friction instrument, lubrication dispenser and scale.

JUSTIFICATION

This task applies to bearings within the instrument. Potential end instruments include an IR spectrometer which is used for measuring solar backscatter radiation, a wide band visible radiometer which is used for measuring solar backscatter radiation, and a UV spectrometer which is used for measuring ozone.

These tasks pertain to bearings which are contained within instruments and are sealed from space environment so that only zero-g effects will act upon them. These are considered to be precision bearings, and the lubrication techniques used may have a critical effect on their performance. Typically, in an IR spectrometer or a UV spectrometer, bearings are used to position a prism or a defraction grating.

NO150	04		TITLE	Install Experim	ent Packag	e		
				DURATION	_			
CYCLE PERI	IOD (HR)	_	4	NO. OF CY	YCLES	2		
SUCCESSOR AND INITIAL	TASK NO LAG TIN	504, (0 hr					
NO OF HEN	II CIVIL I II	, , , , , , , , , , , , , , , , , , ,	HR FROM START					
NO. OF MEN	112KILL II	HR/CYCLE	OF CYCLE					
1	66	4	0	ELECTRICAL POWER	250	W	4	HR/CYCLE
	72	4	0	HR				•
			<u> </u>	SHIPPING WEIGHT5	50 LB	SHIPPING	3 VOLUME _	4 FT ³
EQUIPMENT	Г	D		NAME				
REQUIRED		- M	liscellaneous	Test Equipment	and Sample	S		
					•			
NO 504	1		T.T. 5	Zero-g Effects	on Lubrics	nto For	In + 0 m = 0 1	D:
				DURATION				
				NO. OF C				
			504		TOLES			
			, 0.5 hr		- 41,1-41			
AND INITIAL	L LAG TI	NE						
	T	1	HR FROM START	1				
NO. OF MEN	V SKILL II	HR CYCLI	OF CYCLE					
1	66	3	0	ELECTRICAL POWER	2.0	W	1	HR 'CYCLE
1	71	3	0	2 HR	FROM START OF	CYCLE		
				SHIPPING WEIGHT	<u> </u>	SHIPPIN	G VOLUME _	FT`
EQUIPMENT							1	(See 1504)
REQUIRED	-	ID		NAME				
		1					!	

LEVEL Applied Research for Design Data

DESCRIPTION

The purpose of this test is to determine deterioration of mirror surfaces in space which could be caused by solarization, contamination, distortions, and damage by particle impact. The test is necessary to determine the environmental effects of space that reduce the functional capability of mirrors.

This will be a long-term test requiring enough samples of each mirror material to obtain valid statistical data so as to separate the various environmental parameters.

Sample mirrors will be mounted externally and oriented to be exposed preferentially to the space environment. Samples will periodically be returned to the laboratory for examination and measurements. Optical surface quality will be of prime concern. After evaluation, the samples are returned to the test positions.

Auxiliary equipment will include a test module mounting tool kit, a reflectometer, and a microscope.

JUSTIFICATION

This task applies to large mirrors (approximately 7 ft in diameter) that are used with a pulsed searchlight and detector or a pulsed laser and detector (Lidar) which are used to measure the height of cloud tops and atmospheric pressure.

These large mirrors will be installed externally and therefore will be subject to the full impact of space environment. Over the several years that these mirrors may be used, a gradual deterioration may result from damage by impact of meteorites and other particles. Exposure to the radiations from the sun over long periods of time may cause damage to the mirror or darkening (solarization) of the surfaces. Contaminants in space or contaminants from the exhausts of the laboratory could coat the surfaces. Thermal stresses may act upon the mirror when it is partially exposed to the sunlight.

NO. <u>15</u>	10		TITLE	Install Experiment Pa	ackage	
INTERRUPTI	BLE _	Yes		DURATION (HR)	4	(ON TIME/CYCLE)
CYCLE PERI	OD (HR)	4		NO. OF CYCLES	6	
PREDECESSO	OR TASI	(NON	one			
SUCCESSOR AND INITIAL	TASK N LAG T	0. <u>5</u> IME	10, 0 hr			
NO. OF MEN	SKILL	ID HR/CYCLE	HR FROM START OF CYCLE			
1	66	4	0	ELECTRICAL POWER250	w	4 HR/CYCLE
1	72	4	0	O HR FROM START		
				SHIPPING WEIGHT 10 LB		NG VOLUME 2 FT ³
	<u></u>		<u> </u>			
EQUIPMENT REQUIRED	L	ID		NAME		
		- N	Miscellaneous	Test Equipment and Sam	ples	
	Ĺ					
NO 5	1.0			Envisores outol Effect	A = N 6'	C
				Environmental Effec		
				DURATION (HR)		
				NO. OF CYCLES		
		K NO. <u>15</u> 1		(16 01		
SUCCESSOR AND INITIAL		·	14, 0.5 hr; 1	010, U nr		
NO, OF MEN	SKILL	ID HR/CYCL	HR FROM START			
			OF CTCLE	2.0		0.22
1	66	4	0	ELECTRICAL POWER20	W	U.33 HR/CYCLE
1	71	4	0	HR FROM START	OF CYCLE	
				SHIPPING WEIGHTO LB	SHIPPI	NG VOLUMEO FT
	<u></u>					(See 1510)
EQUIPMENT	- 1	ID		NAME		
REQUIRED	Ī					
	į					

TASK NO. 521 TITLE Development of Nonencapsulated Detectors

LEVEL Development Test

DESCRIPTION

Photosensitive materials are to be tested. The material will be exposed to observe the effects of space environment. This test will require a long period. A sufficient number of sample materials will be required to obtain statistical values, subsequent to manufacturing quality control determination. A protective enclosure will shield the samples from space environment effects not being tested. However, all samples must be exposed to vacuum. Auxiliary equipment will include a test module mounting kit and a radiation calibration module.

JUSTIFICATION

This task is performed as part of the development of a detector for a dual star tracker which is used to measure atmospheric pressure and atmospheric temperature. The purpose of the test is to determine the physical, chemical, and electrical properties of the detector material after exposure to space environment, and to determine the feasibility of eliminating the encapsulating material (required in an earth environment) when the detector is used in space. The encapsulated material limits the spectral range and sensitivity while an unencapsulated material for space use could expand its applications.

NO. <u>15</u>	21	·	TITLE	Install E	Experiment	Package	·
							(ON TIME/CYCL
SUCCESSOR T	TASK N LAG T	0	1, 0 hr				
NO. OF MEN	SKILL	ID HR/CYCLE	HR FROM START OF CYCLE				
1	66	4	0	ELECTRICAL POWE	R250	<u>O</u> w	HR/CYC
1	72	4	0	0	_ HR FROM STAF	RT OF CYCLE	
				SHIPPING WEIGHT _	1.5 L	B SHIPP	ING VOLUME F
EQUIPMENT	ſ	ID		NA	ME		
REQUIRED	Ī	- Mis	20011220000	To at East	4		
		- 10118	scellaneous	Test Equipmer	17		
	ł						
	Į						
NO.	521		ŤITI E	Develon	ment of No	nencangula	ted Detectors
							(ON TIME/CYCL
							(ON TIME/ CYCL
		K NO. <u>1 52</u>		NO.	or orolls		**·
SUCCESSOR		101	3, 0.5 hr				
AND INITIAL	LAG -	TIME					
NO. OF MEN	SKILL	ID HR/CYCLE	HR FROM START OF CYCLE]			
,				EL FOTDIOAL DOWE	D 50		1
1 1	66	4	0	1 3			1 HR/CYC
					_ HR FROM STAF		
		<u> </u>		SHIPPING WEIGHT _	L	B SHIPP	ING VOLUME 0 F
EQUIPMENT	ſ	ID		NA	ME		(500 151
REQUIRED	Ī			· · · · · · · · · · · · · · · · · · ·		······	
	- 1						

TASK NO. 523 TITLE Develop Stabilization Techniques and Determine MORL Dynamic Disturbances

LEVEL Applied Research for Design Data

DESCRIPTION

This test will consist of evaluating the gyro stabilizers employed in dual star trackers.

The gyro stabilization mechanisms will be mounted externally by one crew member. Automatic recording of the vibrations and motions will be obtained for all three axes of each mechanism through the application of small seismic recorders.

The auxiliary on-board equipment will include a test module mounting kit and a seismic recorder.

JUSTIFICATION

This task pertains to gyros that are used on a dual star tracker that measures atmospheric pressure and atmospheric temperature. The task is necessary to determine and measure the forces that cause disturbing movements affecting the function of the star trackers. Actually, the task applies more to the gyro-stabilization system of the telescope rather than to the gyros. The platform for the telescope must be stable and small disturbing forces which tend to rotate MORL would tend to rotate the star tracker unless it were repositioned by a controlled stabilization loop. Because of this, the dynamic disturbances of MORL must be studied and understood so that the control loop for the star tracker can be properly designed.

	<u> Yes</u>		DURA	TION (HR)	3	(ON TIME/CYCLE
3 . OEE . EOB (1	
PREDECESSOR TA						
SUCCESSOR TASK AND INITIAL LAG	NO5			-		
			-			
NO. OF MENSKIL	LIDHR/CYCL	HR FROM START OF CYCLE				
1 66	3	0	TELECTRICAL POWER	250	w 3	HR/CYCLE
1 72	3	0	0			
			SHIPPING WEIGHT	LB	SHIPPING VOLU	IME <u>1 </u>
EQUIPMENT						\neg
REQUIRED	ID		NAM			
	- M	iscellaneous	Test Equipmen	ıt		
						
NO. <u>523</u>		TITLE	Develop S	Stabilization	Techniques	
					n Techniques	
INTERRUPTIBLE	Yes		DURA	ATION (HR)	0.5	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H	Yes R) 72		DURA	ATION (HR)		(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TA	Yes R) 72 SK NO. 152		DURA	ATION (HR)	0.5	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H	Yes R) 72 SK NO. 152 NO. 163	3	DURA	ATION (HR)	0.5	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK	Yes R) 72 SK NO. 152 NO. 163	3 9, 0.5 hr	DURA	ATION (HR)	0.5	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TA SUCCESSOR TASK	Yes R) 72 SK NO. 152 NO. 163 TIME	3 9, 0.5 hr	DURA	ATION (HR)	0.5	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK SUCCESSOR TASK AND INITIAL LAG NO. OF MEN SKILI	Yes R) 72 SK NO. 152 NO. 163 TIME	3 9, 0.5 hr HR FROM START OF CYCLE	DURA NO. C	ATION (HR)	0.5 60	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILI 1 66	Yes R) 72 SK NO. 152 NO. 163 TIME L ID HR/CYCL 0. 5	3 9, 0.5 hr	DURA NO. C	ATION (HR) DF CYCLES	W 0.5	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK SUCCESSOR TASK AND INITIAL LAG NO. OF MEN SKILI 1 66	Yes R) 72 SK NO. 152 NO. 163 TIME	3 P9, 0.5 hr HR FROM START OF CYCLE 0	DURA NO. C	TION (HR) DF CYCLES R 20 HR FROM START	0.5 60 W 0.5	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILI 1 66	Yes R) 72 SK NO. 152 NO. 163 TIME L ID HR/CYCL 0. 5	3 P9, 0.5 hr HR FROM START OF CYCLE 0	DURA NO. C	TION (HR) DF CYCLES R 20 HR FROM START	W 0.5	(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILI 1 66 71 EQUIPMENT	Yes R) 72 SK NO. 152 NO. 163 TIME L ID HR/CYCL 0. 5 0. 5	3 P9, 0.5 hr HR FROM START OF CYCLE 0	DURA NO. C	TION (HR) OF CYCLES R 20 HR FROM START O LB	0.5 60 W 0.5	(ON TIME/CYCLE HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILI 1 66 1 71	Yes R) 72 SK NO. 152 NO. 163 TIME L ID HR/CYCL 0. 5	3 P9, 0.5 hr HR FROM START OF CYCLE 0	DURA NO. C	TION (HR) OF CYCLES R 20 HR FROM START O LB	0.5 60 W 0.5	(ON TIME/CYCLE HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILI 1 66 71 EQUIPMENT	Yes R) 72 SK NO. 152 NO. 163 TIME L ID HR/CYCL 0. 5 0. 5	3 P9, 0.5 hr HR FROM START OF CYCLE 0	DURA NO. C	TION (HR) OF CYCLES R 20 HR FROM START O LB	0.5 60 W 0.5	(ON TIME/CYCLE HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILI 1 66 71 EQUIPMENT	Yes R) 72 SK NO. 152 NO. 163 TIME L ID HR/CYCL 0. 5 0. 5	3 P9, 0.5 hr HR FROM START OF CYCLE 0	DURA NO. C	TION (HR) OF CYCLES R 20 HR FROM START O LB	0.5 60 W 0.5	(ON TIME/CYCLE HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (H PREDECESSOR TASK AND INITIAL LAG NO. OF MEN SKILI 1 66 71 EQUIPMENT	Yes R) 72 SK NO. 152 NO. 163 TIME L ID HR/CYCL 0. 5 0. 5	3 P9, 0.5 hr HR FROM START OF CYCLE 0	DURA NO. C	TION (HR) OF CYCLES R 20 HR FROM START O LB	0.5 60 W 0.5	(ON TIME/CYCLE HR/CYCLE

TASK NO. 534 TITLE Environmental Effects on Television Detectors

LEVEL Applied Research for Design Data

DESCRIPTION

The material to be tested consists of photosensitive surfaces to be employed in television imaging devices. This test is applied to a material; however, the physical and chemical properties of the photosensitive material are difficult to separate from a completed component. Therefore, this test may have to be applied at the component The purpose of the test is to determine the physical, chemical, and electrical properties of the material when exposed to a space environment either encapsulated or unencapsulated depending upon component design. This test is necessary to confirm advanced TV camera concepts which will be required for observing cloud configurations during nighttime viewing and for narrow spectral band observation. Unencapsulated versions must be placed outside the laboratory so as to observe the various space phenomena on the photosensitive surfaces. Encapsulated versions may be located inside the laboratory to evaluate standard imaging properties. The test period will be of long duration so as to determine reliability and sensitivity improvements. General testing procedures will be to determine the chemical and physical characteristic changes. such as its deterioration and resistivity, due to ultraviolet and other radiations. Unencapsulated test procedures are to be utilized when applicable. Auxiliary equipment will include test module mounting kit, calibrated light source test kit, and testing TV system for evaluation.

JUSTIFICATION

This task is applied to TV detectors that are used on a high-resolution TV system for observing cloud types and patterns, and to a dual-channel TV system to measure the height of cloud tops. It is conducted to determine the effects of radiation, deterioration by space particles, effects of laboratory propulsion exhausts, and zero-g effects on photosensitive surfaces to be employed in television imaging devices.

		34		TITLE	Install Experi	ment Pack	age		
INTERRU					DURAT				
					NO. OF				
SUCCESS AND INIT				, 0 hr					
NO OF	MEN	ckii i it	HR/CYCLE	HR FROM START					
110.01	_			UF CYCLE					
	1	66 72	3 3	0 0	ELECTRICAL POWER			3	HR/CYCLE
					0				. 3
					SHIPPING WEIGHT	<u>15</u> LB	SHIPPIN	G VOLUME _	1 FT"
EQUIPMI REQUIR			D		NAME				
KEQUIK	בט		- Mi	scellaneous	Test Equipment				
					• •				
		L							
					.	1 D.C.C			
		1		TITLE	Environmenta		CT T T		
INTERR							n TV Dete		·
			Yes		DURAT	ION (HR)	4		(ON TIME/CYCLE)
	PERIO	OD (HR)	Yes	1 20	DURAT	TION (HR)72	4		(ON TIME/CYCLE)
PREDEC	PERIO CESSO	OD (HR) OR TASK	Yes	1 20 1 5 3 4	DURAT	TION (HR)72	4		(ON TIME/CYCLE)
PREDEC	PERIO CESSO SSOR 1	OD (HR) OR TASK T ASK NO	Yes 	1 20	DURAT	TION (HR)72	4		(ON TIME/CYCLE)
PREDEC SUCCES	PERIO CESSO SSOR 1	OD (HR) OR TASK T ASK NO	Yes 	1 20 1 5 3 4	DURAT	TION (HR)72	4		(ON TIME/CYCLE)
SUCCES AND INI	PERIO CESSO SSOR 1	OD (HR) OR TASK T ASK NC LAG TI	Yes 	120 1534 7, 0.5 hr	DURAT	TION (HR)72	4		(ON TIME/CYCLE)
SUCCES AND INI	PERIO CESSO SOR 1 ITIAL	OD (HR) OR TASK TASK NC LAG TI	Yes NO 165 ME	120 1534 7, 0.5 hr - HR FROM START OF CYCLE	DURAT	TION (HR)72	4		(ON TIME/CYCLE)
SUCCES AND INI	PERIO CESSO SSOR 1	OD (HR) OR TASK T ASK NC LAG TI	Yes NO	120 1534 7, 0.5 hr	DURAT NO. OF	TION (HR)72	W		(ON TIME/CYCLE)
SUCCES AND INI	PERIO CESSO SSOR 1 ITIAL MEN	OD (HR) OR TASK NC LAG TH SKILL I	Yes NO 165 ME HR/CYCLI	120 1534 7, 0.5 hr HR FROM START OF CYCLE 0	DURAT NO. OF ELECTRICAL POWER 2	TION (HR)72 CYCLES72	4 W OF CYCLE	0,5	(ON TIME/CYCLE) HR/CYCLE
SUCCES AND INI	PERIO CESSO SSOR 1 ITIAL MEN	OD (HR) OR TASK NC LAG TH SKILL I	Yes NO 165 ME HR/CYCLI	120 1534 7, 0.5 hr HR FROM START OF CYCLE 0	DURAT NO. OF	TION (HR)72 CYCLES72	4 W OF CYCLE	0,5	(ON TIME/CYCLE)
NO. OF	PERIO CESSOR SSOR T ITIAL MEN 1	OD (HR) OR TASK TASK NC LAG TH SKILL I	Yes NO 165 ME HR/CYCLI	120 1534 7, 0.5 hr HR FROM START OF CYCLE 0	DURAT NO. OF ELECTRICAL POWER 2	TION (HR)	4 W OF CYCLE	0,5	(ON TIME/CYCLE) HR/CYCLE O FT ³
SUCCES AND INI NO. OF	PERIO CESSOR SSOR T ITIAL MEN 1	OD (HR) OR TASK TASK NC LAG TH SKILL I	Yes NO 165 ME DHR/CYCLI 4 4	120 1534 7, 0.5 hr HR FROM START OF CYCLE 0	ELECTRICAL POWER 2 SHIPPING WEIGHT	TION (HR)	4 W OF CYCLE	0,5	(ON TIME/CYCLE) HR/CYCLE O FT ³
NO. OF	PERIO CESSOR SSOR T ITIAL MEN 1	OD (HR) OR TASK TASK NC LAG TH SKILL I	Yes NO 165 ME DHR/CYCLI 4 4	120 1534 7, 0.5 hr HR FROM START OF CYCLE 0	ELECTRICAL POWER 2 SHIPPING WEIGHT	TION (HR)	4 W OF CYCLE	0,5	(ON TIME/CYCLE) HR/CYCLE O FT ³
NO. OF	PERIO CESSOR SSOR T ITIAL MEN 1	OD (HR) OR TASK TASK NC LAG TH SKILL I	Yes NO 165 ME DHR/CYCLI 4 4	120 1534 7, 0.5 hr HR FROM START OF CYCLE 0	ELECTRICAL POWER 2 SHIPPING WEIGHT	TION (HR)	4 W OF CYCLE	0,5	(ON TIME/CYCLE) HR/CYCLE O FT ³
NO. OF	PERIO CESSOR SSOR T ITIAL MEN 1	OD (HR) OR TASK TASK NC LAG TH SKILL I	Yes NO 165 ME DHR/CYCLI 4 4	120 1534 7, 0.5 hr HR FROM START OF CYCLE 0	ELECTRICAL POWER 2 SHIPPING WEIGHT	TION (HR)	4 W OF CYCLE	0,5	(ON TIME/CYCLE) HR/CYCLE O FT ³

TASK NO.

601

TITLE

Determine Characteristics and Verify Cooling Techniques of Infrared and Ultraviolet Detectors

LEVEL

Development Test

DESCRIPTION

Infrared and ultraviolet detectors must be tested. The purpose of these tests is to determine operating characteristics and verify cooling techniques employed in space. An integral part of the test is the temperature range required. Cryogenic, radiation, and thermal-electric cooling techniques may be evaluated.

The test will be performed externally. It will be necessary to remove the detectors from storage, mount, align, and shield the instrument. Three samples probably will be required of each detector. They will be assembled in a module which will be inserted in the test instrument, then exposed to calibrated radiation sources. Readout will be automatically recorded within the laboratory. After the calibration test, the detectors will be pointed to observe natural targets.

The equipment necessary to mount the detectors will include a mounting tool kit, recording oscilloscope within the laboratory, a calibrated energy source module, and a temperature evaluation module.

JUSTIFICATION

This task is required to determine the operating characteristics of IR and UV detectors, as they are applied to the specific instruments which use them. The characteristics of these detectors, such as wavelength, sensitivity, frequency response, and how these vary in space will be determined.

Detectors, especially if the application requires a high sensitivity, will require cooling. Cooling may be by cryogenics, radiative techniques, or thermoelectric techniques, or combinations of these techniques.

NO	1601		TITLE	Install Experiment Packa	g e		
				DURATION (HR)			
				NO. OF CYCLES			
	TASK NO.						
NO. OF MEN	SKILL ID HR	/CYCLE	HR FROM START OF CYCLE				
1	66 72	4	0	ELECTRICAL POWER3001 HR FROM START OF	CYCLE		
L				SHIPPING WEIGHT 1.5 LB	SHIPPIN	IG VOLUME	FT°
EQUIPMENT REQUIRED	ID			NAME]
NO60	01		TITLE	Determine Detector Chara	cteristi	cs, Vei	ify Cooling
				DURATION (HR)			
				NO. OF CYCLES	16		
			601		1 1710	0.1	1511
SUCCESSOR AND INITIAL	LAG TIME		, 0 hr, 123 , 0 hr	9, 0 hr; 1704, 0 hr; 1705, 0	nr; 1719	, U hr;	1711, 0 hr;
NO. OF MEN	SKILL ID HR	CYCLE	HR FROM START OF CYCLE				
1 1	66	3	0	ELECTRICAL POWER150	w	3	HR/CYCLE
			-	O HR FROM START OF	CYCLE		
<u> </u>				SHIPPING WEIGHTOLB	SHIPPIN	G VOLUME	0FT ³
EQUIPMENT	ID			NAME			(See 1601)
REQUIRED				IVAIIIL			

TASK NO. 603 TITLE Determine Characteristics of Photomultipliers

LEVEL Development Test

DESCRIPTION

Three photomultipliers will be contained in a module. A crew member will remove the module from the storage area and mount it in a receptacle located outside the laboratory. After mounting, it will be necessary to expose the photomultiplier tubes to a test module containing calibrated energy sources. Each group of three photomultiplier tubes is to be shielded from all but certain specified radiations. A mounting tool kit, calibrated energy source module, and automatic recording devices on board the laboratory will be required to install and test the tubes.

JUSTIFICATION

Photomultipliers must be tested in this task to obtain operating characteristics of photomultiplier tubes for light-sensitive surfaces. The photomultipliers are employed in dual-channel visible and wide-band radiometers to measure the height of cloud tops; these radiometers will occupy a critical position outside the laboratory.

This task is to determine whether the characteristics of the photomultiplier tubes are as anticipated for operation in an Earth-orbit environment.

INTERRUPTIBLE		Yes			DURATION (HR)	3.5	(ON	TIME CYCLE
					NO. OF CYCLES			
PREDECESSOR T	TASK NO.	6						
	K NO.							
NO. OF MEN SKI	LL IDHR	CYCLE	HR FROM START OF CYCLE]				·····
1 6	66 72	3. 5 3. 5	0 0	ELECTRICAL F	POWER 400 HR FROM START HT LB	OF CYCLE		
EQUIPMENT	ID				NAME			
REQUIRED	_	Mi	scellaneous	Test Fauin	-			
			nple Detect		ment			
INTERRUPTIBLE	<u> </u>	Yes			ne Characterist DURATION(HR)	0.3	(0)	TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD ((HR)	Yes 168				0.3	(0)	TIME/CYCLE
INTERRUPTIBLE	E (HR) TASK NO. SK NO.	Yes 168			NO. OF CYCLES	0.3	(O)	NTIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS	(HR) (FASK NO. SK NO. G TIME	Yes 168 1 1703	603 , 0. 25 hr; HR FROM START	1700, 0.25	NO. OF CYCLES	0.3	(O)	NTIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI	(HR) (FASK NO. SK NO. G TIME	Yes 168 1703 /CYCLE 0.3	603 , 0.25 hr; HR FROM START OF CYCLE O	1700, 0.25	NO. OF CYCLES	0.3 8	(0)	TIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI	(HR) (FASK NO. SK NO. G TIME	Yes 168 1 1703	603 , 0.25 hr; HR FROM START OF CYCLE	1700, 0.25 ELECTRICAL I	DURATION (HR) NO. OF CYCLES hr,	0.3 8	(0)	TIME/CYCLE
NTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI	(HR) (FASK NO. SK NO. G TIME	Yes 168 1703 /CYCLE 0.3	603 , 0.25 hr; HR FROM START OF CYCLE O	1700, 0, 25 ELECTRICAL I	DURATION (HR) NO. OF CYCLES hr. POWER200	0. 3 8 WW	0.3	HR/CYCLE
NTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI	(HR) (FASK NO. SK NO. G TIME	Yes 168 1703 /CYCLE 0.3	603 , 0.25 hr; HR FROM START OF CYCLE O	1700, 0, 25 ELECTRICAL I	DURATION (HR) NO. OF CYCLES hr. POWER200 HR FROM START	0. 3 8 WW	O. 3	HR/CYCLE

TASK NO. 604 TITLE Verify Lubrication Techniques in an Orbital Environment

LEVEL Development Test

DESCRIPTION

The purpose of this task is to verify lubricant parameters in a space environment. The test is necessary to determine the coefficient of friction, adhesive, and viscosity capabilities when applied to gimbals, bearings, and mounts. The test will be performed outside laboratory on appropriate portions of instruments such as cameras, radiometers, and antennas.

A crew member must apply the lubricants to proper surfaces at time of instrument installation. Measurement of friction and viscosity during installation will be made along with the amount of lubrication applied. The lubricant is to be monitored periodically throughout the duration of the program. Whenever possible, materials are to be retained for more detailed analysis. Equipment necessary to perform this task will include a lubrication applicator, volumetric measurer, viscosity measurement device, coefficient of friction measurement or torque indicator tool, and miscellaneous assembly alignment tools.

JUSTIFICATION

In a space environment or in a zero-g environment, the success of the lubrication qualities and overall effectiveness of lubrication will be determined to a large extent by the design of the bearing and the lubrication methods. Tests will be conducted in a space environment to ensure that the lubrication will remain effective over long periods of time. Lubrication techniques will be tested on virtually all components of instruments utilized on board the laboratory.

				Install Experiment Equ		
				DURATION (HR.		
				NO. OF CYCLES		
PREDECESSO	R TASK	NO1,	504			
SUCCESSOR T			04,_0 <u>hr</u>			
NO. OF MEN	SKILL IE	HR/CYCLE	HR FROM START OF CYCLE			
1	66	4	0	ELECTRICAL POWER500	W4	HR'CYCLE
ı i	72	4	Ö	O HR FROM START OF		
				SHIPPING WEIGHT7 LB	SHIPPING VOLUME	0.3FT ³
EQUIPMENT		ID		NAME		7
REQUIRED	-	-	callanaous T	est Equipment		4
	ľ		ricant Sampl			
	<u> </u>	1				J
NO	61	04	TITLE	Verify Lubrication Tech	niques	
				Verify Lubrication Tech DURATION (HR)		
INTERRUPTI	BLE	Υe	es		0.25	(ON TIME CYCLE)
INTERRUPTI	BLE OD (HR)	Y e	es 68	DURATION (HR)	0.25	(ON TIME CYCLE)
INTERRUPTI CYCLE PERI PREDECESSO SUCCESSOR	BLE OD (HR) OR TASK TASK NO	Y 6	68 604 236, 0 hr; 1	DURATION (HR)	0.25 10 0 hr; 1704, 0 h	(ON TIME CYCLE)
INTERRUPTI CYCLE PERI PREDECESSO	BLE OD (HR) OR TASK TASK NO	Y 6	68 604 236, 0 hr; 1	DURATION (HR) NO. OF CYCLES	0.25 10 0 hr; 1704, 0 h	(ON TIME CYCLE)
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL	BLE OD (HR) OR TASK TASK NO LAG TIM	Y 6 NO. 1 1 AE 171	es 68 604 236, 0 hr; 1 0, 0 hr; 171	DURATION (HR)	0.25 10 0 hr; 1704, 0 h	(ON TIME CYCLE)
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN	BLEOD (HR) OR TASK TASK NO LAG TIN	Y 6 NO1 NO1 AE	68 604 236, 0 hr; 1 0, 0 hr; 171 HR FROM START OF CYCLE	DURATION (HR)	0.25 10 0 hr; 1704, 0 h 0 hr; 1719, 0 hr;	(ON TIME CYCLE)
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL	BLEOD (HR) OR TASK TASK NO LAG TIM	Y 6 NO. 1 1 AE 171 HR/CYCLE 0.25	es 68 604 236, 0 hr; 1 0, 0 hr; 171	DURATION (HR)	0.25 10 0 hr; 1704, 0 h 0 hr; 1719, 0 hr; W 0.25	(ON TIME CYCLE)
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN	BLEOD (HR) OR TASK TASK NO LAG TIN	Y 6 NO1 NO1 AE	68 604 236, 0 hr; 1 0, 0 hr; 171 HR FROM START OF CYCLE	DURATION (HR)	0.25 10 0 hr; 1704, 0 h 0 hr; 1719, 0 hr; W0.25 F CYCLE	(ON TIME CYCLE) 17; 1705, 0 hr 1721, 0 hr.
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL	BLEOD (HR) OR TASK TASK NO LAG TIM	Y 6 NO. 1 1 AE 171 HR/CYCLE 0.25	68 604 236, 0 hr; 1 0, 0 hr; 171 HR FROM START OF CYCLE	DURATION (HR)	0.25 10 0 hr; 1704, 0 h 0 hr; 1719, 0 hr; W 0.25	(ON TIME CYCLE) 17; 1705, 0 hr 1721, 0 hr.
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	BLEOD (HR) OR TASK NO LAG TIM	Y 6 NO. 1 1 AE 171 HR/CYCLE 0.25	68 604 236, 0 hr; 1 0, 0 hr; 171 HR FROM START OF CYCLE	DURATION (HR)	0.25 10 0 hr; 1704, 0 h 0 hr; 1719, 0 hr; W W 0.25 F CYCLE SHIPPING VOLUME	(ON TIME CYCLE) 17: 1705, Ohr 1721, Ohr.
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1	BLEOD (HR) OR TASK NO LAG TIM	Y 6 NO. 1 1 AE 171 DHR/CYCLE 0.25 0.25	68 604 236, 0 hr; 1 0, 0 hr; 171 HR FROM START OF CYCLE	DURATION (HR)	0.25 10 0 hr; 1704, 0 h 0 hr; 1719, 0 hr; W W 0.25 F CYCLE SHIPPING VOLUME	(ON TIME CYCLE) 17; 1705, 0 hr 1721, 0 hr.
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	BLEOD (HR) OR TASK NO LAG TIM	Y 6 NO. 1 1 AE 171 DHR/CYCLE 0.25 0.25	68 604 236, 0 hr; 1 0, 0 hr; 171 HR FROM START OF CYCLE	DURATION (HR)	0.25 10 0 hr; 1704, 0 h 0 hr; 1719, 0 hr; W W 0.25 F CYCLE SHIPPING VOLUME	(ON TIME CYCLE) 17; 1705, 0 hr 1721, 0 hr.
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	BLEOD (HR) OR TASK NO LAG TIM	Y 6 NO. 1 1 AE 171 DHR/CYCLE 0.25 0.25	68 604 236, 0 hr; 1 0, 0 hr; 171 HR FROM START OF CYCLE	DURATION (HR)	0.25 10 0 hr; 1704, 0 h 0 hr; 1719, 0 hr; W W 0.25 F CYCLE SHIPPING VOLUME	(ON TIME CYCLE) 17; 1705, 0 hr 1721, 0 hr.
OYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	BLEOD (HR) OR TASK NO LAG TIM	Y 6 NO. 1 1 AE 171 DHR/CYCLE 0.25 0.25	68 604 236, 0 hr; 1 0, 0 hr; 171 HR FROM START OF CYCLE	DURATION (HR)	0.25 10 0 hr; 1704, 0 h 0 hr; 1719, 0 hr; W W 0.25 F CYCLE SHIPPING VOLUME	(ON TIME CYCLE) 17; 1705, 0 hr 1721, 0 hr.

TASK NO.. 608 TITLE Extravehicular Assembly Techniques (Optical Instruments)

LEVEL Development Test

DESCRIPTION

This task is to determine proper techniques for handling refracting and reflecting items. Tests will be conducted inside and outside the laboratory. The test procedure will consist of obtaining the optical elements from storage and mounting them to the various instruments used. An important phase of this task will be the competence of the crew members near the end of their tour of duty.

Proper installation will be verified through the use of calibration instruments so as to ensure that the instruments are properly aligned and tuned. The materials will be retained. Equipment necessary for installation will include an installation assembly tool kit, an alignment kit, and a calibrated energy source.

JUSTIFICATION

Extra and intravehicular assembly techniques are to be examined in this task. The purpose is to determine proper techniques for handling refracting and reflecting items to preserve their optical quality in space environments. The test is necessary because incorrect handling techniques could easily damage the delicate surfaces of the items. In many instances, these instruments will be mounted inside the laboratory. In this case, some type of mirror on the gimbal mount may be employed outside the laboratory to provide the scanning angle required for these instruments. Also, when the instruments are mounted inside the laboratory, optical windows will be required. These windows and mirrors will require great handling care so that their optical qualities will be maintained and special techniques may be required. This could pose some definite problems in extravehicular assembly techniques.

.,	100	8	LE	Install Experi	nent Pa	ackage		
INTERRUPTI				DURATIO				
CYCLE PERI	IOD (HR)	4		NO. OF C				
PREDECESSO	OR TASK	NO	6					
SUCCESSOR AND INITIAL		, <u> </u>	608, 0 hr					
NO. OF MEN	SKILL I	D HR/CYCLE	HR FROM START OF CYCLE					
1 1 1	60 66 67	4 4 4	0 0 0	ELECTRICAL POWER HF SHIPPING WEIGHT 2	R FROM STA	ART OF CYC	CLE	
EQUIPMENT REQUIRED	Γ	ID		NAME				٦
	(00			nstallation and T				
				Extravehicula				
				DURATIO				
				NO. OF C	YCLES			
PREDECESSOR SUCCESSOR		NU	,00					
AND INITIAL	ות מעתו) . 12		30 0 hr: 1700 0	h. 17	02 0 1-	1704 01	. 1705 . 0.1
			236, 0 hr; 12	39, 0 hr; 1700, 0				r; 1705, 0 hr;
1710 NO. OF MEN	SKILL I 60 66	THR/CYCLE 3 3	236, 0 hr; 12 0 hr; 1716, E HR FROM START OF CYCLE 0 0	0 hr; 1718, 0 hr; ELECTRICAL POWER _	200	0 hr; 1	721, 0 hr. W1.	
1710 NO. OF MEN	SKILL I	DHR/CYCLE	0 hr; 1716, HR FROM START OF CYCLE 0	0 hr; 1718, 0 hr; ELECTRICAL POWER	200	O hr; 1	721, 0 hr. W1.	5HR/CYCLE
1710 NO. OF MEN	SKILL I 60 66	THR/CYCLE 3 3	236, 0 hr; 12 0 hr; 1716, E HR FROM START OF CYCLE 0 0	0 hr; 1718, 0 hr; ELECTRICAL POWER _	200	O hr; 1	721, 0 hr. W1.	

TASK NO. 613 TITLE Evaluate Photomultiplier Detectors

LEVEL Development Test

DESCRIPTION

The test will be conducted inside the laboratory. It will be necessary to obtain the photomultiplier tube from storage and, after insertion of the proper filters, to align and tune the photomultiplier to the pulsed searchlight. Recording of the photomultiplier output will concern proper alignment which will aid in determining the signal-to-noise ratio. After the initial installation and alignment procedures, the test will be automatic. However, the installation and alignment techniques will initially require two men. The test should be repeated as atmospheric conditions on Earth change. The equipment necessary to conduct these tests will include a recording oscilloscope, photomultiplier tube-calibration kit, alignment instrumentation, meters, and various hand tools.

JUSTIFICATION

This task is to be applied to a photomultiplier detector for a pulsed searchlight and detector that is used to measure the height of cloud tops and measure atmospheric pressure. Photomultiplier signal-to-noise ratio is to be determined in this test. The pulsed searchlight normally operates at visible frequencies and therefore would normally be restricted to operation at night. There is a possibility that an absorption line of the solar spectrum could be used for daytime operation and, with the photomultiplier detector tuned to this absorption line, the searchlight could be used during daylight with little interference. The purpose of the test is to verify the selective wavelengths and filters against background ambient light. This test is necessary to determine the feasibility of utilizing a spectrum absorption line of a solar spectrum during daylight. This will be a new concept and will require verification in space. The second part of the task would be to determine the background noise level caused by the residual ambient skylight that has not been filtered out. This task also includes evaluation of the filters that will be used to accomplish this task.

OCT PERIOD (HR) 3	INTERRUPTIE	BLE	<u>Y</u> es		DURATION (HR)3	(ON TIME / CVCLE
NO. 0F MEN SKILL ID HR FROM START OF CYCLE HR FROM START OF CYCLE OF C						
NO. OF MEN SKILL ID HR/CYCLE HR FROM START O	PREDECESSO	R TASK NO).	None	NO. OF CICES	
NO. 0F MEN SKILL ID HR/CYCLE HR FROM START OF CYCLE 1						
1	AND INITIAL	LAG TIME				
1	<u> </u>			LUD EDOM STADT	7	
1	NO. OF MEN	SKILL ID H	R/CYCLE			
1				0	ELECTRICAL POWER 500 W 3	HR/CYCLE
ID	1	72	3	0		
ID					SHIPPING WEIGHT 20 LB SHIPPING VOLUME	1 FT
NAME	ECHIPMENT					
NO	-	ID			NAME	
DURATION (HR)		1	Mis	scellaneous	Test Equipment and Samples	
DURATION (HR)						
DURATION (HR)		ļ				
DURATION (HR)						
DURATION (HR)						
DURATION (HR)						_
DURATION (HR)						
DURATION (HR)						
DURATION (HR)						
CYCLE PERIOD (HR)	NO61	3		TITLE	Evaluate Photomultiplier Detectors	
None None						(ON TIME/CYCLE)
None None	INTERRUPTIE	BLE	Yes		DURATION (HR) 0.3	(ON TIME/CYCLE)
NO. OF MEN SKILL ID HR/CYCLE	INTERRUPTIE	BLE	Yes 4		DURATION (HR) 0.3	(ON TIME/CYCLE)
1	INTERRUPTIE CYCLE PERIO PREDECESSO	BLE DD (HR) R TASK NO	Yes 4	1613	DURATION (HR) 0.3	(ON TIME/CYCLE)
1	INTERRUPTIE CYCLE PERIO PREDECESSO SUCCESSOR T	BLE DD (HR) R TASK NO. TASK NO.	Yes 4	1613	DURATION (HR) 0.3	(ON TIME/CYCLE)
1 71 0.3 0 O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING VOLUME O FT (See 1613)	INTERRUPTIE CYCLE PERIO PREDECESSOR T AND INITIAL	BLE DD (HR) R TASK NO FASK NO. LAG TIME	Yes 4	None	DURATION (HR) 0.3 NO. OF CYCLES 6	(ON TIME/CYCLE)
O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING VOLUME O FT (See 1613)	INTERRUPTIE CYCLE PERIO PREDECESSO SUCCESSOR T AND INITIAL	BLE DD (HR) R TASK NO FASK NO. LAG TIME	Yes 4	None HR FROM START	DURATION (HR) 0.3 NO. OF CYCLES 6	(ON TIME/CYCLE)
SHIPPING WEIGHT 0 LB SHIPPING VOLUME 0 FT (See 1613)	INTERRUPTIE CYCLE PERIC PREDECESSOR T AND INITIAL NO. OF MEN	BLE DD (HR) R TASK NO. TASK NO. LAG TIME	Yes 4	None HR FROM START OF CYCLE	DURATION (HR) 0.3 NO. OF CYCLES 6	
EQUIPMENT	INTERRUPTIE CYCLE PERIC PREDECESSOR T AND INITIAL NO. OF MEN	BLE DD (HR) R TASK NO. TASK NO. LAG TIME	Yes 4	None HR FROM START OF CYCLE 0	DURATION (HR) 0.3 NO. OF CYCLES 6 ELECTRICAL POWER 200 W 0.	
- 1 (1) 1 NΛM-	INTERRUPTIE CYCLE PERIC PREDECESSOR T AND INITIAL NO. OF MEN	BLE DD (HR) R TASK NO. TASK NO. LAG TIME	Yes 4	None HR FROM START OF CYCLE 0	DURATION (HR) 0.3 NO. OF CYCLES 6 ELECTRICAL POWER 200 W 0. O HR FROM START OF CYCLE	3HR/CYCLE
REQUIRED	INTERRUPTIE CYCLE PERIC PREDECESSOR T AND INITIAL NO. OF MEN	BLE DD (HR) R TASK NO. TASK NO. LAG TIME	Yes 4	None HR FROM START OF CYCLE 0	DURATION (HR) 0.3 NO. OF CYCLES 6 ELECTRICAL POWER 200 W 0. O HR FROM START OF CYCLE	3HR/CYCLE
	INTERRUPTIE CYCLE PERIO PREDECESSOR T AND INITIAL NO. OF MEN 1 1 1	BLE DD (HR) R TASK NO. LAG TIME SKILL ID H 66 71	Yes 4	None HR FROM START OF CYCLE 0	DURATION (HR) 6 NO. OF CYCLES 6 ELECTRICAL POWER 200 W 0. 0 HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME	3HR/CYCLE
	NO. OF MENS	BLE DD (HR) R TASK NO. LAG TIME SKILL ID H 66 71	Yes 4	None HR FROM START OF CYCLE 0	DURATION (HR) 6 NO. OF CYCLES 6 ELECTRICAL POWER 200 W 0. 0 HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME	3HR/CYCLE
	INTERRUPTIE CYCLE PERIO PREDECESSOR T AND INITIAL NO. OF MEN 1 1 1	BLE DD (HR) R TASK NO. LAG TIME SKILL ID H 66 71	Yes 4	None HR FROM START OF CYCLE 0	DURATION (HR) 6 NO. OF CYCLES 6 ELECTRICAL POWER 200 W 0. 0 HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME	.3 HR/CYCLE
	INTERRUPTIE CYCLE PERIO PREDECESSOR T AND INITIAL NO. OF MEN 1 1 1	BLE DD (HR) R TASK NO. LAG TIME SKILL ID H 66 71	Yes 4	None HR FROM START OF CYCLE 0	DURATION (HR) 6 NO. OF CYCLES 6 ELECTRICAL POWER 200 W 0. 0 HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME	3HR/CYCLE
	INTERRUPTIE CYCLE PERIO PREDECESSOR T AND INITIAL NO. OF MEN 1 1 1	BLE DD (HR) R TASK NO. LAG TIME SKILL ID H 66 71	Yes 4	None HR FROM START OF CYCLE 0	DURATION (HR) 6 NO. OF CYCLES 6 ELECTRICAL POWER 200 W 0. 0 HR FROM START OF CYCLE SHIPPING WEIGHT 0 LB SHIPPING VOLUME	3HR/CYCLE

TASK NO. 614 TITLE Verify Space Assembly Boresight and Alignment Techniques -- Large Mirror

LEVEL Development Test

DESCRIPTION

Assembly procedures for mirrors, gimballed mounts, boresighting and alignment of mirrors will be examined in this task. The test will be located both inside and outside the laboratory. It will be necessary for two crew members to obtain the mirror and gimballed assemblies and mount them on the proper receptacle. After mounting, the crew members will perform alignment tests to ensure proper assembly. The mirror will also be checked with boresighting and alignment checks. The materials are to be retained. The equipment necessary to perform the task will include mounting tools and alignment instruments, boresighting modules, oscilloscopes, and cameras.

JUSTIFICATION

This task pertains to mirrors which are used in a pulsed searchlight and detector which is used for measuring height of cloud tops and atmospheric pressure. This task is similar to other extravehicular tasks which involve the space assembly technique. The mirrors are large and bulky and may be difficult to mount and align correctly. Because these highly directive mirrors have a narrow field of view, the two mirrors must be aligned accurately, one with the other. If the searchlight mirror does not shine upon the same area of the Earth that is being scanned by the detector mirror, proper signal response will not result. Therefore, the prime task is to determine how accurately two mirrors can be aligned or boresighted to the same pointing direction.

CYCLE PERIOD (HR)	14, 0 hr LE HR FROM START OF CYCLE 0 0 0	ELECTRICAL POWER 1,000 W 3 O HR FROM START OF CYCLE SHIPPING WEIGHT 200 LB SHIPPING VOLUME NAME Test and Installation Equipment	HR/CYCLI
PREDECESSOR TASK NO	10 14, 0 hr LE HR FROM START OF CYCLE 0 0 0 0	ELECTRICAL POWER 1,000 W 3 O HR FROM START OF CYCLE SHIPPING WEIGHT 200 LB SHIPPING VOLUME NAME Test and Installation Equipment	HR/CYCL
NO. OF MEN SKILL ID HR/CYC 1 60 4 1 66 4 1 67 4 EQUIPMENT REQUIRED NO. 614 INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2	HR FROM START OF CYCLE 0 0 0 0	ELECTRICAL POWER 1,000 W 3 O HR FROM START OF CYCLE SHIPPING WEIGHT 200 LB SHIPPING VOLUME NAME Test and Installation Equipment	HR/CYCL
1 60 4 1 66 4 1 67 4 EQUIPMENT REQUIRED NO. 614 INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2	0 0 0	ELECTRICAL POWER 1,000 W 3 O HR FROM START OF CYCLE SHIPPING WEIGHT 200 LB SHIPPING VOLUME NAME Test and Installation Equipment	
1 66 4 1 67 4 EQUIPMENT REQUIRED NO	0 0 Miscellaneous	O HR FROM START OF CYCLE SHIPPING WEIGHT 200 LB SHIPPING VOLUME NAME Test and Installation Equipment	
1 67 4 EQUIPMENT REQUIRED NO	0 Miscellaneous	SHIPPING WEIGHT 200 LB SHIPPING VOLUME NAME Test and Installation Equipment	:10_FT
NO. 614 INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2		NAME Test and Installation Equipment	10 FT
NO. 614 INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2		Test and Installation Equipment	
NO614 INTERRUPTIBLEYes CYCLE PERIOD (HR)2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2			
NO614 INTERRUPTIBLEYes CYCLE PERIOD (HR)2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2	Swo 7-ft diame	eter mirrors	
INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2			
INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2			
INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2			_
INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2			
INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2			
INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2			
INTERRUPTIBLE Yes CYCLE PERIOD (HR) 2 PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2	TITLE	Verify Space Assembly Techniques	
PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2			/ON TIME / CVCLE
PREDECESSOR TASK NO SUCCESSOR TASK NO AND INITIAL LAG TIME NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2		NO. OF CYCLES2	
NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2		NO. 01 010ELS	
NO. OF MEN SKILL ID HR/CYC 1 60 2 1 66 2 1 67 2			
1 60 2 1 66 2 1 67 2			
1 60 2 1 66 2 1 67 2	HR FROM START	FT	
1 66 2 1 67 2	OF CYCLE		
1 67 2	0	ELECTRICAL POWER 200 W	2 HR/CYCLE
	Ö	O HR FROM START OF CYCLE	
		SHIPPING WEIGHT O LB SHIPPING VOLUME	0FT
EQUIPMENT I			(See 1614)
REQUIRED		NAME	4
			1

TASK NO. 615 TILE Determine Radiation Effects on Discharge Tube Characteristics

LEVEL Development Test

DESCRIPTION

A discharge tube is to be tested outside the laboratory. It will be necessary for one crew member to obtain the discharge tube and direct its radiation towards a calibrating photomultiplier tube. The duration of the flash as a function of voltage applied must be recorded and analyzed. The photomultiplier tube output must also be recorded and analyzed to determine the band width as observed through various filters. Materials are to be retained. The equipment required will be optical filters, recording oscilloscope, various standard meters, and the general analytical instruments available on board the laboratory.

JUSTIFICATION

This task applies to a discharge tube which serves as a pulsed light source for a pulsed searchlight and detector, which is an instrument used to measure the height of cloud tops and atmospheric pressure. The pulsed light source is a high-intensity pulse of a short duration. The pulse of light is currently conceived as being generated by storing a large amount of energy in a capacitor or other storage device and then suddenly discharging it across a spark gap. The amount of energy that is released depends upon the voltage at the initiation of the discharge. If the MORL vehicle happens to be in radiation environment, and the gas within the discharge is partially ionized, the discharge tube characteristics may be altered and the characteristics or magnitude of the light output may be affected. These effects could alter the intensity of the pulse and consequently alter the ability of the detectors to see the light that is reflected back from this lower intensity pulse. The purpose of the test is to verify radiation specifications in space during operation in a typical radiation environment.

	IRI E	Yes		Install Experiment Pac		
	יוטרר	3.5		DURATION (HR)		(ON TIME/CYCLE
	COD TACK A		None	NO. OF CYCLES	1	
AND INITIAL	L LAG TIME					
NO. OF MEN	N SKILL ID	HR/CYCLE	HR FROM START OF CYCLE			
1	66	3.5	0	ELECTRICAL POWER1,000	w 3.5	HR/CYCLE
1	72	3.5	0	O HR FROM START		1110 01022
				SHIPPING WEIGHT5 LB		: 2 ET
EQUIPMENT					SITI I ING VOLUME	· []
REQUIRED	10			NAME		
	-	Mi	scellaneous	Test Equipment]
	ŀ					
						J
				Determine Radiation E		
INTERRUPT	IBLE	Yes		DURATION (HR)	0.3	
INTERRUPT	IBLE	Yes			0.3	
INTERRUPT	IBLE	Yes 0.6		DURATION (HR)	0.3	
INTERRUPT CYCLE PER PREDECESS SUCCESSOR	IBLE IOD (HR) _ SOR TASK NO	Yes 0.6 0	1615	DURATION (HR)	0.3	
INTERRUPT CYCLE PER PREDECESS	IBLE IOD (HR) _ SOR TASK NO	Yes 0.6 0	1615	DURATION (HR)	0.3	
OYCLE PER PREDECESS SUCCESSOR AND INITIAL	IBLE IOD (HR) _ SOR TASK NO. TASK NO. L LAG TIME	Yes 0.6 0.	1615 None	DURATION (HR)	0.3	
INTERRUPT CYCLE PER PREDECESS SUCCESSOR	IBLE IOD (HR) _ SOR TASK NO. TASK NO. L LAG TIME	Yes 0.6 0.	1615 None	DURATION (HR)	0.3	
OYCLE PER PREDECESS SUCCESSOR AND INITIAL	IBLE IOD (HR) _ SOR TASK NO. TASK NO. L LAG TIME	Yes 0.6 0. HR/CYCLE	1615 None HR FROM START OF CYCLE	DURATION (HR) NO. OF CYCLES	0.3 5	(ON TIME/CYCLE)
OYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN	IBLE IOD (HR) _ SOR TASK NO. TASK NO. L LAG TIME	Yes 0.6 0.	1615 None HR FROM START	DURATION (HR) NO. OF CYCLES	0.3 5	(ON TIME/CYCLE)
OYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN	IBLE FIOD (HR) _ FOR TASK NO. TASK NO. L LAG TIME	Yes 0.6 0. HR/CYCLE 0.3	1615 None HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 1,000 HR FROM START	0.3 5 W W 0.3	(ON TIME/CYCLE) HR/CYCLE
OYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN	IBLE FIOD (HR) _ FOR TASK NO. TASK NO. L LAG TIME	Yes 0.6 0. HR/CYCLE 0.3	1615 None HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES	0.3 5 W W 0.3	(ON TIME/CYCLE) HR/CYCLE O FT ³
OYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN	IBLE FIOD (HR) _ FOR TASK NO. L LAG TIME VSKILL ID 66 71	Yes 0.6 0	1615 None HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER	0.3 5 W W 0.3	(ON TIME/CYCLE) HR/CYCLE
NO. OF MEN	IBLE FIOD (HR) _ FOR TASK NO. L LAG TIME V SKILL ID 66 71	Yes 0.6 0	1615 None HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER 1,000 HR FROM START	0.3 5 W W 0.3	(ON TIME/CYCLE) HR/CYCLE O FT ³
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE FIOD (HR) _ FOR TASK NO. L LAG TIME VSKILL ID 66 71	Yes 0.6 0	1615 None HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER	0.3 5 W W 0.3	(ON TIME/CYCLE) HR/CYCLE O FT ³
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE FIOD (HR) _ FOR TASK NO. L LAG TIME VSKILL ID 66 71	Yes 0.6 0	1615 None HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER	0.3 5 W W 0.3	(ON TIME/CYCLE) HR/CYCLE O FT ³
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE FIOD (HR) _ FOR TASK NO. L LAG TIME VSKILL ID 66 71	Yes 0.6 0	1615 None HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER	0.3 5 W W 0.3	(ON TIME/CYCLE) HR/CYCLE O FT ³
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE FIOD (HR) _ FOR TASK NO. L LAG TIME VSKILL ID 66 71	Yes 0.6 0	1615 None HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER	0.3 5 W W 0.3	(ON TIME/CYCLE) HR/CYCLE O FT ³
INTERRUPT CYCLE PER PREDECESS SUCCESSOR AND INITIAL NO. OF MEN 1 1 1	IBLE FIOD (HR) _ FOR TASK NO. L LAG TIME VSKILL ID 66 71	Yes 0.6 0	1615 None HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES ELECTRICAL POWER	0.3 5 W W 0.3	(ON TIME/CYCLE) HR/CYCLE O FT ³

TASK NO. 616 TITLE Verify Space Assembly and Alignment Techniques — Lidar Detection Mirror

LEVEL Development Test

DESCRIPTION

Assembly techniques are to be tested during this task. The purpose is to verify space assembly procedures for erecting and mounting a 7-ft mirror and aligning the mirror with a laser beam in space environment. The test will be conducted outside the laboratory. It will be necessary for the first test to retrieve the mirror from the storage area. Two crew members will be required to assemble, erect, and mount the mirror on gimbal mounts. Then, the two crew members will move the mirror to the gimbal mount site and align the mirror to within 20 to 30 sec of arc of a specified target. Verification or rejection of the alignment will be obtained through readout equipment located inside the laboratory. The alignment procedure will require the utilization of laser photographic techniques and a ground base target. A mounting tool kit, alignment tool kit, and laser instrumentation, plus aligning camera module, will also be required.

JUSTIFICATION

This task will utilize a mirror approximately 7 ft in diameter mounted or used in a Lidar which may be used to measure the height of cloud tops, atmospheric pressure, and sea state.

GENERAL COMMENTS

Task 616 is similar to Task 614 which pertains to the pulsed searchlight and detector. The primary difference is that a single spectral line of visible radiation is used as a pulse laser rather than the broader spectrum of visible energy used by the pulsed searchlight. In this case, only one mirror is involved since the laser itself provides a narrow beam width.

As with the pulse searchlight, accurate alignment of the laser with the detector mirror is necessary. However, the accuracy does not have to be as great because the laser beam illuminates an area which is only a small part of the area viewed by the detection mirror. Therefore, the laser energy will be returned if it falls somewhere within the detection circle of the mirror.

INTERRUPTI	IBLE	Yes		DURATION (HR)4	(ON TIME / CYCLE)
CYCLE PERI	IOD (HR)	4		NO. OF CYCLES 4	(ON TIME, OTOLL)
PREDECESS(OR TASK	۷05	10	101 01 01 01 0 1 0 1 0 1 0 1 0 1 0 1 0	
	TASK NO.				
NO. OF MEN	SKILL ID	HR/CYCLE	HR FROM START		
1 1 1	60 66 72	4 4 4	0 0 0	ELECTRICAL POWER W	
	<u> </u>			SHIPPING WEIGHT 100 LB SHIPPING VOLUME	15 FT ³
EQUIPMENT				NAME]
REQUIRED	-	М	iscellaneous	s Test and Installation Equipment	1
	-		ne 7-ft diam		
	-	L	aser Signal	Generator	
	L	1			f
	<u> </u>				J
					J
					ļ
NO	616		TITLE	Verify Space-Assembly and Alignment Te	chniques
INTERRUPTI	BLE	Yes		DURATION (HR) 0.5	(ON TIME CYCLE)
INTERRUPTI	BLE	Yes		Verify Space-Assembly and Alignment Te DURATION (HR) 0.5 NO. OF CYCLES 2	(ON TIME CYCLE)
INTERRUPTII CYCLE PERIO PREDECESSO	BLE OD (HR) _ OR TASK I	Yes 16	8 1616	DURATION (HR) 0, 5 NO. OF CYCLES 2	(ON TIME CYCLE)
INTERRUPTII CYCLE PERII PREDECESSO SUCCESSOR 1	BLE OD (HR) _ OR TASK I TASK NO.	Yes 16	8	DURATION (HR) 0, 5 NO. OF CYCLES 2	(ON TIME CYCLE)
INTERRUPTII CYCLE PERIO PREDECESSO	BLE OD (HR) _ OR TASK I TASK NO.	Yes 16	8 1616	DURATION (HR) 0, 5 NO. OF CYCLES 2	(ON TIME CYCLE)
INTERRUPTII CYCLE PERII PREDECESSO SUCCESSOR 1	BLE OD (HR) _ DR TASK I TASK NO. LAG TIM	Yes 16	8 1616 246, 0.5 hr;	DURATION (HR) 0.5 NO. OF CYCLES 2 617, 0 hr	(ON TIME CYCLE)
INTERRUPTII CYCLE PERIO PREDECESSOR T AND INITIAL NO. OF MEN	BLEOD (HR) _ OR TASK I TASK NO. LAG TIM SKILL ID	Yes 16 10. HR/CYCLE 0.5	8 1616 246, 0.5 hr; HR FROM START OF CYCLE 0	DURATION (HR) 0.5 NO. OF CYCLES 2 617, 0 hr	(ON TIME CYCLE)
INTERRUPTII CYCLE PERIO PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN	BLEOD (HR) _ DR TASK I TASK NO. LAG TIM SKILL ID 60 66	Yes 16 10. HR/CYCLE 0.5 0.5	8 1616 246, 0.5 hr; HR FROM START OF CYCLE 0 0	DURATION (HR) 0.5 NO. OF CYCLES 2	(ON TIME CYCLE)
INTERRUPTII CYCLE PERIO PREDECESSOR TAND INITIAL NO. OF MEN 1 1	BLEOD (HR) _ OR TASK I TASK NO. LAG TIM SKILL ID	Yes 16 10. HR/CYCLE 0.5	8 1616 246, 0.5 hr; HR FROM START OF CYCLE 0	DURATION (HR) O. 5 NO. OF CYCLES 2 617, 0 hr ELECTRICAL POWER 2,000 W O HR FROM START OF CYCLE	O. 5 HR/CYCLE
INTERRUPTII CYCLE PERIO PREDECESSOR TAND INITIAL NO. OF MEN 1 1 1 1 1	BLEOD (HR) _ DR TASK I TASK NO. LAG TIM SKILL ID 60 66	Yes 16 10	8 1616 246, 0.5 hr; HR FROM START OF CYCLE 0 0	DURATION (HR) O. 5 NO. OF CYCLES 2 617, 0 hr ELECTRICAL POWER 2,000 W O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING VOLUME.	O. 5 HR/CYCLE
INTERRUPTII CYCLE PERIO PREDECESSOR AND INITIAL NO. OF MEN 1 1 1	BLEOD (HR) _ DR TASK NO. LAG TIM SKILL ID 60 66 71	Yes 16 10	8 1616 246, 0.5 hr; HR FROM START OF CYCLE 0 0	DURATION (HR) O. 5 NO. OF CYCLES 2 617, 0 hr ELECTRICAL POWER 2,000 W O HR FROM START OF CYCLE	O. 5 HR/CYCLE
INTERRUPTII CYCLE PERIO PREDECESSOR TAND INITIAL NO. OF MEN 1 1 1 1 1	BLEOD (HR) _ DR TASK NO. LAG TIM SKILL ID 60 66 71	Yes 16 10	8 1616 246, 0.5 hr; HR FROM START OF CYCLE 0 0	DURATION (HR) O. 5 NO. OF CYCLES 2 617, 0 hr ELECTRICAL POWER 2,000 W O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING VOLUME.	O. 5 HR/CYCLE
INTERRUPTII CYCLE PERIO PREDECESSOR TAND INITIAL NO. OF MEN 1 1 1 1 1	BLEOD (HR) _ DR TASK NO. LAG TIM SKILL ID 60 66 71	Yes 16 10	8 1616 246, 0.5 hr; HR FROM START OF CYCLE 0 0	DURATION (HR) O. 5 NO. OF CYCLES 2 617, 0 hr ELECTRICAL POWER 2,000 W O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING VOLUME.	O. 5 HR/CYCLE
INTERRUPTII CYCLE PERIO PREDECESSOR TAND INITIAL NO. OF MEN 1 1 1 1 1	BLEOD (HR) _ DR TASK NO. LAG TIM SKILL ID 60 66 71	Yes 16 10	8 1616 246, 0.5 hr; HR FROM START OF CYCLE 0 0	DURATION (HR) O. 5 NO. OF CYCLES 2 617, 0 hr ELECTRICAL POWER 2,000 W O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING VOLUME.	O. 5 HR/CYCLE

TASK NO. 617

TITI F

Evaluate Pulsed Laser Excitor Tube in the Orbital Environment

. LEVEL

Development Test

DESCRIPTION

Laser functions are to be tested in this task. The purpose of the test is to determine radiation effects on pulse-laser excitor tube. Its signal-to-noise ratio, beam width, and frequencies for night and day operation must be determined. The test will be conducted outside the laboratory. It will be necessary for one crew member to obtain the laser instrumentation from the storage area and mount it on a site located on the structure of the laboratory. Measurements will then be made of the ambient radiation level, pulse duration, and intensities. The returned beam-width diameter will be measured by moving the photomultiplier tube test module to the extremities of the beam crosssectional area. Signal-to-noise ratio is to be determined inside the laboratory. Equipment will include a mounting tool kit, alignment tool kit, photomultiplier test module, and recording instrumentation on board the laboratory.

JUSTIFICATION

This task is applied to a pulsed laser which is employed in the Lidar system used to measure the height of cloud tops and atmospheric pressure. If the MORL is in a radiation environment, it may be that the ionization characteristics of the excitor tube may be affected, and part of this task will be to determine whether or not those effects are detrimental to the operation of the laser. As in the pulsed searchlight and detector, it may be necessary to determine laser frequencies that will permit both day and night operation. Because of the differences between the beam width of the detection mirror and the beam width of the laser transmitter, it may be desirable to alter the output beam width of the laser.

NO. 61	. 7		TITLE	Evaluat	e Pulsed Lase	r Excitor Tu	ıbe
INTERRUPT							(ON TIME CYCLE)
					NO. OF CYCLES	10	
PREDECESS	OR TASK	NO	616				
SUCCESSOR AND INITIAL	TASK NO). ME	246, 0.25	hr			
NO. OF MEN	SKILL I	HR CYCL	HR FROM START OF CYCLE				
1	66 71	0.25			O HR FROM STA	RT OF CYCLE	0.25 HR/CYCLE
				SHIPPING WEI	IGHT0	_B SHIPPII	$\begin{array}{c} \text{VG VOLUME} & 0 \\ \hline \text{(See 1616)} \end{array}$
EQUIPMENT REQUIRED		ID			NAME		
· ·		l4 Li	dar				

TASK NO. 619 TITLE Determine Characteristics and Verify Cooling Techniques Detectors for Visible Radiometers

LEVEL Development Test

DESCRIPTION

The test will be conducted outside the laboratory. Cryogenic, radiation, and thermal electric cooling techniques must be applied and evaluated to ensure that the desired temperature has been achieved. It will be necessary for one crew member to obtain the detectors from the storage area and to mount them in a shielded module so that all extraneous radiation will not be interfering with the test. The mounting unit will provide cooling instrumentation and a calibrated light source. Readout will take place in the laboratory and will be continuously monitored.

JUSTIFICATION

This task applies to detectors that are used in dual-channel and wide-band visible radiometers which are used for measuring solar backscattering radiation and height of cloud tops and on a polarimeter that is used to measure phase of cloud hydrometeors. This task will test the detector characteristics during specified cooling procedures. The purpose of the task is to verify whether or not the cooling technique is functioning properly. It is necessary to conduct the test to ensure spectral response and sensitivity of the detector. The determination of the temperature range that will be required is an integral part of the test.

	101,		TITLE	Install Experiment Pac	kage	
				DURATION (HR)		(ON TIME/CYCLE)
CYCLE PERI	OD (HR)	4		NO. OF CYCLES	8	
PREDECESSO	OR TASK	NO	None			
SUCCESSOR AND INITIAL	TASK NO	D	619, 0 hr			
NO. OF MEN	SKILL I	DIHB/CVCI E	HR FROM START]		
110.01 111	ļ	<u> </u>	OF CYCLE			
1 1	60 66	4 4	0	ELECTRICAL POWER500		HR/CYCLE
i	72	4	ő	1.5 HR FROM START		•
L		<u> </u>		SHIPPING WEIGHT LB	SHIPPING VOLUME	0.5 FT ³
EQUIPMENT	r	ID		MANE		1
REQUIRED				NAME		
			scellaneous m p le Detecto	Test Equipment		
	ľ					
	L					<u>.</u>
				Determine Characterist	tics and Cooling —	Visible
NO6]	9		TITLE	Radiometer Detectors		
INTERRUPT	IBLE _	Yes		DURATION (HR)	0.5	(ON TIME/CYCLE)
				NO. OF CYCLES	10	
PREDECESS	OR TASI	K NO	1619			
SUCCESSOR	TASK N	0	1700, 0	hr; 1703, 0.25 hr; 1710, 0) hr	
AND INITIAL	- LAG I	ME				
NO OF MEN	CKILL	DHR/CYCLE	HR FROM START	ר		
INO. OF WILL	ISKILL	DINK/CYCLE	OF CYCLE	1		
	66	0.5	0	ELECTRICAL POWER20	0 w0.	25 HR/CYCLE
1		0.5	' 0	O HR FROM START		
1 1	71	0.3	1		0, 0,000	MO 010 <u>L</u> E
	/1	0.3		1		•
1		0.3		SHIPPING WEIGHTO LB		•
1 EQUIPMENT		ID		1		0_ FT ³
1				SHIPPING WEIGHTO LB		0_ FT ³
1 EQUIPMENT				SHIPPING WEIGHTO LB		0_ FT ³
1 EQUIPMENT				SHIPPING WEIGHTO LB		0_ FT ³
1 EQUIPMENT				SHIPPING WEIGHTO LB		0_ FT ³
1 EQUIPMENT				SHIPPING WEIGHTO LB		0FT

LEVEL Development Tests

DESCRIPTION

Microwave radiometer performance will be tested in this task. The instrument will be located outside the laboratory. A crew member will obtain the radiometer from a storage area and mount it on a support outside the laboratory. Results will be recorded and readout will be made inside the laboratory where signal-to-noise ratios will be determined. Space and environmental effects are to be noted as a phenomenon occurs. Readings of temperature standards must be made periodically to ensure proper overall function. Known microwave radiations from specific locations will be read periodically to determine repeatability of the instrument. Installation equipment, alignment equipment, and a portable microwave energy source will be required.

JUSTIFICATION

This task applies to the microwave radiometer used for the purpose of measuring atmospheric humidity. This application of the microwave radiometer requires obtaining radiometric measurements at several microwave frequencies while the antenna of the instrument is scanned in a vertical plane, forward along the flight path of the MORL vehicle. Humidity data are determined through a mathematical procedure which relates the several simultaneous measurements at each of several pointing angles.

Since this new technique is in a development phase, it will be necessary to determine the proper angles at which the various readings should be made. Since microwave radiometers usually have integration times on the order of 1 sec, the spacing of sequential groups of readings may determine the accuracy with which the mathematical procedures will interpret the data in terms of humidity. Therefore, a period of trial and error will be necessary.

Measurements over known areas will be taken and work will be performed with the data obtained. While a microwave radiometer is being used, periodic readings of a reference temperature standard must be made. Also, each instrument channel must be calibrated before and after each group of measurements are made. Therefore, this task really relates to developing the proper procedures to be used in calibrating the instruments and using the reference temperature standards, as well as the establishing pointing angle stabilization techniques and data rates for the humidity measuring experiment.

CYCLE PERIOD PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI	(HR) _ TASK N SK NO. G TIMI	4	18 623, 0 hr	ELECTRICAL POWER	OF CYCLES	8	
PREDECESSOR TAS SUCCESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 1 1	LL ID	HR/CYCLE	18 623, 0 hr HR FROM START OF CYCLE 0	ELECTRICAL POWER			
SUCCESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 1 EQUIPMENT	LL ID	HR/CYCLE	HR FROM START OF CYCLE	ELECTRICAL POWER			
NO. OF MEN SKI	LL ID	HR/CYCLE	HR FROM START OF CYCLE	ELECTRICAL POWER			
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INTERRUPTIBLE	Ξ	Yes		DURA	TION (HR)	0.5	(ON TIME/CYCLE)
PREDECESSOR 7							
SUCCESSOR TAS	K NO.		1236, 0.	25 hr			
AND INITIAL LA	G TIMI	<u> </u>					
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EQUIPMENT	[10			·			
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634 TITLE Evaluate Radar Components

LEVEL Development Tests

DESCRIPTION

TASK NO.

Radar operation is to be tested in this task. The purpose of the task is to determine space environment effects on tuning, adjusting, aligning, and operating a radar from an orbiting laboratory. The test is necessary because radar instruments will be highly complex and critical. The test will be located outside and inside the laboratory. Three crew members will be necessary to procure the radar instrumentation from the storage area. Assembling, aligning, and adjusting the instrument will require portable signal generators. Meters, oscilloscopes, and visual-display radar screens will be operated within the laboratory. Specific targets will be used to determine the characteristics of these instruments as observed by the radar and to determine the ability of the radar to lock on to the target. An alignment tool kit, oscilloscope, various meters, and a calibrated signal generator will be required.

JUSTIFICATION

This task pertains to radar in K and C bands, one of which may be used for range measurements. Involved in this task are tuning, adjusting, aligning, maintaining, and operating a radar from a space vehicle. The radar may be considered a complex component consisting of transmitter, receiver, antenna controls, and visual displays. In the case of K-band radar, it is foreseen that different frequencies within the K-band region may be required to operate upon different types of targets. This is because the K-band frequency region is an area containing both atmospheric transmission and nonatmospheric transmission bands. Therefore, a frequency used to observe the ground may not be the proper frequency when observing clouds.

Because of the complexity of the radar, it is foreseen that the operating personnel will require the use of signal generators, oscilloscopes, and other meters to align and adjust and keep the radar in operating condition. It will be necessary to determine the ability of the radar to acquire and lock on targets from a space vehicle. The measurement of wind, as presently conceived, involves the detection and tracking of balloons which may be instrumented to measure meteorological parameters. These balloons must be known and interrogated by the radar. The approximate balloon location must be known and then a suitable radar search pattern must be applied which will detect the presence of the balloon, lock on, and continue to track it. This must be done in the presence of large ground based reflective targets which may be at the same detection range as the balloon, or even closer depending upon the pointing angle of the radar. The problem will be to ensure that the radar maintains its range gate locked on to the desired target and not upon some other ground target which appears to be larger at the time. This may require a transponder on the balloon which responds at a frequency offset from the radar frequency.

The radar operator may have to vary the radar's operating parameters to make it function properly. The radar antenna must move in a scan pattern to acquire the target. It may well be that reaction torques will be set up which cause the MORL attitude-control system to respond. In this case, the two systems may oppose each other and it may be difficult to aim at, and lock onto, the target.

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						18		
SUCCESSOR T	ASK NO. LAG TIME	6.3	4, 0hr					
NO. OF MENS	KILL ID HI	R/CYCLE	HR FROM START OF CYCLE]				
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SUCCESSOR T	R TASK NO. LAG TIME	1	634 226, 0.5 hr					
NO. OF MEN	R TASK NO. LAG TIME	1	634 226, 0.5 hr]				
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TASK NO. 639 TITLE Determine Platform Stabilization Characteristics

LEVEL Development Test

DESCRIPTION

Gyro characteristics are to be examined. The purpose of the test is to determine stability or attitude control of dual-star trackers for space environment. Because of the highly critical and accurate measurements required of this instrument, the test will be conducted outside and inside the laboratory. The track assembly will be mounted prior to launch and prepared for operational tests by removing protective covers and tie-down restraints. The tracking mode will be programmed. Two crew members will activate the instrument by switch and point the tracker in the general direction of simulated star pattern. The equipment necessary will be a simulated star pattern module, a vibration recorder, and recording instrumentation located inside the laboratory.

JUSTIFICATION

This task is applied to gyros which are used in a dual-star tracker for measuring atmospheric pressure and atmospheric temperature.

A stable platform, or at least a platform of known characteristics, will be required to obtain accurate measurements with the dual-star tracker. Stabilization or attitude control may be sufficient. However, if stabilization or attitude control is insufficient, local stabilization of the dual-star tracker may be required. Nevertheless, the characteristics of the stabilization or attitude control of the platform must be known.

INTERRUPTIBLE		Yes		DURATION (HR)	3.5	((ON TIME/CYCLE
				NO. OF CYCLES			
SUCCESSOR TASI AND INITIAL LAC	K NO.	63					
NO. OF MENISKI	LL ID	HR/CYCLF	HR FROM START				
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				SHIPPING WEIGHT 10 LB	SHIPPING	VOLUME	0.5 FT
EQUIPMENT REQUIRED	10)		NAME			
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NO	639	,	TITLE	Determine Platform Stab	ilization (Characte	ristics
							-
INTERRUPTIBLE		Yes			0.5	((ON TIME/CYCLE
INTERRUPTIBLE	HR) _	Yes 96		DURATION (HR)	0.5	((ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR T SUCCESSOR TAS	HR) _ ASK NO.	Yes 96 10		DURATION (HR) NO. OF CYCLES	0.5	((ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR T	HR) _ ASK NO.	Yes 96 10	1639	DURATION (HR) NO. OF CYCLES	0.5	((ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR T SUCCESSOR TAS	HR) _ TASK NO. K NO. G TIM	Yes 96 No	1639 1713, 0.25	DURATION (HR) NO. OF CYCLES	0.5	((ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA	HR) _ ASK N K NO. G TIM	Yes 96 NO HR/CYCLE	1639 1713, 0.25 HR FROM START OF CYCLE	DURATION (HR) NO. OF CYCLES hr	0.5 5	((ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI	HR) _ TASK NO. K NO. G TIM	Yes 96 No	1639 1713, 0.25	hr ELECTRICAL POWER200	0.5 5	((ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI	HR) _ ASK NO. K NO. G TIM	Yes 96 NO HR/CYCLE	1639 1713, 0.25 HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES hr ELECTRICAL POWER 200 O HR FROM START OF	0.5 5 W	0.5	ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI	HR) _ ASK NO. K NO. G TIM	Yes 96 NO HR/CYCLE	1639 1713, 0.25 HR FROM START OF CYCLE 0	hr ELECTRICAL POWER200	0.5 5 W	0.5	ON TIME/CYCLE HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 1 2 EQUIPMENT	HR) _ ASK NO. K NO. G TIM	Yes 96 NO HR/CYCLE 0.5 0.5	1639 1713, 0.25 HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES hr ELECTRICAL POWER 200 O HR FROM START OF	0.5 5 W	0.5	ON TIME/CYCLE
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INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 1 2 EQUIPMENT	HR) _ FASK NO. G TIM LL ID	Yes 96 10 HR/CYCLE 0.5 0.5	1639 1713, 0.25 HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES hr ELECTRICAL POWER	0.5 5 W	0.5	ON TIME/CYCLE HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 1 2 EQUIPMENT	HR) _ FASK NO. G TIM LL ID	Yes 96 10 HR/CYCLE 0.5 0.5	1639 1713, 0.25 HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES hr ELECTRICAL POWER	0.5 5 W	0.5	ON TIME/CYCLE HR/CYCLE
INTERRUPTIBLE CYCLE PERIOD (PREDECESSOR TAS AND INITIAL LA NO. OF MEN SKI 1 1 2 EQUIPMENT	HR) _ FASK NO. G TIM LL ID	Yes 96 10 HR/CYCLE 0.5 0.5	1639 1713, 0.25 HR FROM START OF CYCLE 0	DURATION (HR) NO. OF CYCLES hr ELECTRICAL POWER	0.5 5 W	0.5	ON TIME/CYCLE HR/CYCLE

TASK NO. 640 TITLE Intravehicular and Extravehicular Assembly Techniques -- Star Tracker Components

LEVEL Development Test

DESCRIPTION

Because of the accuracies required of star trackers, this will be a highly critical test. The tests will be conducted outside and inside the laboratory. The star tracker will be retrieved from the storage area along with associated instrumentation. It will be assembled and tested inside the laboratory and then later re-assembled, mounted, and tested externally. The tests will utilize a simulated star pattern module. Two crew members will be required for this operation. An assembly tool kit will be necessary to install the star tracker, and a star-pattern simulation module will be necessary to check the function of the tracker.

JUSTIFICATION

This task is applied to optical, electronic, and mechanical components that are used in a dual-star tracker for measuring atmospheric pressure and atmospheric temperature. This task requires development of intravehicular and extravehicular assembly techniques of optical, electronic, and mechanical components that are to be used in the dual-star tracker. The dual-star tracker requires precision optical, electronic, and mechanical components in its assembly, and handling of these components in space will require special assembly techniques, tools, etc. These skills can be developed in space. Also, pointing accuracies of the dual-star tracker will be tested.

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No. Star Tracker Star Tracker Star Tracker									
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NO. OF MEN SKILL ID HR-CYCLE HR FROM START OF CYCLE 1	SUCCESSOR T	TASK NO	640						
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NO. 640	KEQUILED		Misce	llaneous '	Test Equip	ment			
NO. 640 TITLE Intravehicular and Extravehicular Assembly Technique		_			rest nquipi	nent			
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1 71 0.5 0 O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING VOLUME O FT EQUIPMENT REQUIRED NAME (See 1640)	SUCCESSOR AND INITIAL	TASK NO	171	3, 0.25 h	<u>r</u>				
SHIPPING WEIGHT 0 LB SHIPPING VOLUME 0 FT (See 1640) REQUIRED	SUCCESSOR AND INITIAL	TASK NO	171 /CYCLE H	R FROM START		POWER 200	W	0. 5	HB/CVCI F
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REQUIRED NAME	NO. OF MEN	SKILL ID HE	171 //CYCLE H	R FROM START OF CYCLE	ELECTRICAL O	HR FROM STAF	RT OF CYCLE		
KEQUIKED	NO. OF MEN	SKILL ID HE	171 //CYCLE H	R FROM START OF CYCLE	ELECTRICAL O	HR FROM STAF	RT OF CYCLE		0 FT
- Star Tracker	NO. OF MEN 1 1 1 EQUIPMENT	SKILL ID HF	171 //CYCLE H	R FROM START OF CYCLE	ELECTRICAL O	HR FROM STAF	RT OF CYCLE		0 FT
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TASK NO. 657 TITLE Determine Characteristics of Television Detectors

LEVEL Development Test

DESCRIPTION

Television light sensitive surfaces will be tested in this task. The test will take place outside the laboratory. One crew member will obtain the television test module from the storage area and mount the module on the laboratory support structure. Alignment and adjustment will be obtained by directing the camera to a high-resolution test module, with the result being recorded on a laboratory instrument. The equipment necessary will be instrument mounting tool kit, instrument aligning tool kit, and high-resolution television target.

JUSTIFICATION

This task applies to TV detectors that are employed in a high-resolution TV system for determining or observing cloud types and patterns, and is used in a dual-channel TV system to measure the height of cloud tops. It is possible that these detectors will not be ordinary vidicon or image orthicon detectors but instruments that will advance the state of the art. The general effects of either radiation or magnetic fields, different in orbit than that on Earth, could upset the high-precision linearity required in these detectors. Also, it is possible in the case of a high-resolution TV system that an infrared sensitive device will be used and the operating characteristics of these detectors should be proved on an orbiting vehicle.

INTERRUPTIBLE		Yes			DURATION (HR)	3.5		(ON TIME / CVC) E
- CYCLE PERIOD (+	4R)	3.5			NO. OF CYCLES	1		(ON TIME) OTOLL
					NO. OF CICLS			
AND INITIAL LAG	TIME		<u> </u>					
								
NO. OF MEN SKIL	L ID H	R/CYCLE	HR FROM START OF CYCLE					
1 6	6	3.5	0	ELECTRICAL	POWER 500	w	3.5	HR/CYCLE
1 7	2	3.5	0		HR FROM START			
					GHT150 LB		IG VOLUME	6 FT
							IG FOLOME	
EQUIPMENT REQUIRED	ID				NAME]
WEGOWES	-	М	iscellaneou	s Test and	Installation Equ	ipment		
	-	Sa	ample TV D	etectors				
	-	Т	V System C	omponents				
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	L.							1
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	<u></u>	1						J
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INTERRUPTIBLE	Y	es			DURATION (HR)	0.5		(ON TIME/CYCLE
INTERRUPTIBLE	Y	es 72				0.5		(ON TIME/CYCLE
INTERRUPTIBLE	<u>Y</u>	es 72			DURATION (HR)	0.5		(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR T. SUCCESSOR TASH	<u> </u>	es 721	657		DURATION (HR)	0.5		(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR T.	<u> </u>	es 721	657		DURATION (HR) NO. OF CYCLES	0.5		(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASI AND INITIAL LAC	HR) ASK NO K NO. G TIME	es 72 . 1	657 718, 0.5 hr	; 1721, 0 h	DURATION (HR) NO. OF CYCLES	0.5		(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR T. SUCCESSOR TASH	HR) ASK NO K NO. G TIME	es 72 . 1	657 718, 0.5 hr	; 1721, 0 h	DURATION (HR) NO. OF CYCLES r; 1659, 0 hr	0.5		(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASK AND INITIAL LAC NO. OF MEN SKIL 1 6	YAR)ASK NO (NO. G TIME	72 . 1 1 R/CYCLE	657 718, 0.5 hr	; 1721, 0 h	DURATION (HR) NO. OF CYCLES	0.5		(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASE SUCCESSOR TASE AND INITIAL LAC	YAR)ASK NO (NO. G TIME	72 . 1 1	657 718, 0.5 hr HR FROM START OF CYCLE	; 1721, 0 h	DURATION (HR) NO. OF CYCLES r; 1659, 0 hr	0.5 3		(ON TIME/CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASK AND INITIAL LAC NO. OF MEN SKIL 1 6	YAR)ASK NO (NO. G TIME	72 . 1 1 R/CYCLE	657 718, 0.5 hr HR FROM START OF CYCLE 0	ELECTRICAL 0	DURATION (HR) NO. OF CYCLES r; 1659, 0 hr POWER 500 HR FROM START	0.5 3 WW	0.5	(ON TIME / CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASK AND INITIAL LAC NO. OF MEN SKIL 1 6 1 7	YAR)ASK NO (NO. G TIME	72 . 1 1 R/CYCLE	657 718, 0.5 hr HR FROM START OF CYCLE 0	ELECTRICAL 0	DURATION (HR) NO. OF CYCLES r; 1659, 0 hr POWER500	0.5 3 WW	0.5	(ON TIME / CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASK AND INITIAL LAC NO. OF MEN SKIL 1 6 1 7 EQUIPMENT	YAR)ASK NO (NO. G TIME	72 . 1 1 R/CYCLE	657 718, 0.5 hr HR FROM START OF CYCLE 0	ELECTRICAL 0	DURATION (HR) NO. OF CYCLES r; 1659, 0 hr POWER 500 HR FROM START	0.5 3 WW	0.5	(ON TIME / CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASK AND INITIAL LAC NO. OF MEN SKIL 1 6 1 7	HR) ASK NO (NO. G TIME	72 1 1 R/CYCLE 0.5 0.5	657 718, 0.5 hr HR FROM START OF CYCLE 0	ELECTRICAL 0	DURATION (HR) NO. OF CYCLES r; 1659, 0 hr POWER 500 HR FROM START GHT 0 LB	0.5 3 WW	0.5	(ON TIME / CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASK AND INITIAL LAC NO. OF MEN SKIL 1 6 1 7 EQUIPMENT	ASK NO (NO. G TIME)	72 1 1 R/CYCLE 0.5 0.5	657 718, 0.5 hr HR FROM START OF CYCLE 0 0	ELECTRICAL 0	DURATION (HR) NO. OF CYCLES r; 1659, 0 hr POWER 500 HR FROM START GHT 0 LB	0.5 3 WW	0.5	(ON TIME / CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASK AND INITIAL LAC NO. OF MEN SKIL 1 6 1 7 EQUIPMENT	ASK NO (NO. G TIME)	72 1 1 R/CYCLE 0.5 0.5	657 718, 0.5 hr HR FROM START OF CYCLE 0 0	ELECTRICAL 0	DURATION (HR) NO. OF CYCLES r; 1659, 0 hr POWER 500 HR FROM START GHT 0 LB	0.5 3 WW	0.5	(ON TIME / CYCLE
INTERRUPTIBLE CYCLE PERIOD (I PREDECESSOR TASK AND INITIAL LAC NO. OF MEN SKIL 1 6 1 7 EQUIPMENT	ASK NO (NO. G TIME)	72 1 1 R/CYCLE 0.5 0.5	657 718, 0.5 hr HR FROM START OF CYCLE 0 0	ELECTRICAL 0	DURATION (HR) NO. OF CYCLES r; 1659, 0 hr POWER 500 HR FROM START GHT 0 LB	0.5 3 WW	0.5	(ON TIME / CYCLE

TITLE Determine Characteristics of Zoom Lenses

LEVEL Development Test

659

DESCRIPTION

TASK NO.

Zoom lens focusing and mechanical movements are to be tested in this task. One member of the crew will remove the lens from the storage area and mount it on a TV camera. A resolution target will be presented beyond the designed infinity distance for that lens. Automatic recording of the image will take place inside the laboratory while the crew member outside the laboratory places the target at various distances. Resolution targets, instrument assembly kit, assembly kit, and instrument alignment kit will be required. An image recording device will also be required inside the laboratory.

JUSTIFICATION

This task applies to zoom lenses that are to be employed on a high-resolution TV system used to observe cloud types and patterns, and on a dual-channel TV system which is used to obtain height of cloud tops. Basic operating characteristics of zoom lenses are of two different types. One type relates to the resolution or imaging qualities as a function of focal lengths, and the other type relates to the accuracy of the mechanical motions and calibration of these lenses. This task is to determine and evaluate these characteristics in a space environment.

O	INTERRUPTII	BLE _		Yes		DURATION (HR)3	(ON TIME / CYCLE
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NO. OF MEN SKILL ID HR CYCLE HR FROM START OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE OF CYCLE SHIPPING WEIGHT 10 LB SHIPPING VOLUME 0.3 FT (See 1657)							
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1					0	ELECTRICAL POWER 500 W	3 HR/CYCLE
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NO			10	TV	System		
NO659			_		•	Lenses	
NO659			_		_		
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NO. OF MEN SKILL ID HR CYCLE HR FROM START O. 5 O. 3 O. 5 O. 5							
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No. of cycles 3							
NO. OF MEN SKILL ID HR CYCLE HR FROM START OF CYCLE							
NO. OF MEN SKILL ID HR CYCLE HR FROM START OF CYCLE OF	INTERRUPTI	BLE _		Yes		DURATION (HR) 0.5	
NO. OF MEN SKILL ID HR CYCLE HR FROM START OF CYCLE	INTERRUPTI CYCLE PERI	BLE _ OD (HF	₹)	Yes le	58	DURATION (HR) 0.5	
1	INTERRUPTI CYCLE PERI PREDECESSO	BLE _ OD (HF OR TAS	R)	Yes le	58 1659	DURATION (HR) 0. 5 NO. OF CYCLES 3	
1	INTERRUPTI CYCLE PERI PREDECESSO SUCCESSOR	BLE _ OD (HE OR TAS TASK	R) SK NO. NO .	Yes le	58 1659	DURATION (HR) 0. 5 NO. OF CYCLES 3	
1	INTERRUPTI CYCLE PERI PREDECESSO SUCCESSOR	BLE _ OD (HE OR TAS TASK	R) SK NO. NO .	Yes le	58 1659	DURATION (HR) 0. 5 NO. OF CYCLES 3	
TO THE PROMISE THE	INTERRUPTI CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL	BLE _ OD (HF DR TAS TASK LAG	R) SK NO. NO. TIME	Yes 16	68 1659 1718, 0.5 HR FROM STARI	DURATION (HR) 0.5 NO. OF CYCLES 3 hr; 1721, 0 hr	
SHIPPING WEIGHT O LB SHIPPING VOLUME O FT (See 1659) EQUIPMENT REQUIRED	CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN	BLE _ OD (HE DR TAS TASK LAG	R) SK NO. NO. TIME	Yes 16	68 1659 1718, 0.5 HR FROM START OF CYCLE	DURATION (HR) 0.5 NO. OF CYCLES 3 hr; 1721, 0 hr	(ON TIME / CYCLE
REQUIRED NAME	CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN	BLE _ OD (HE OR TAS TASK . LAG	SK NO. NO. TIME	Yes 16 CYCLE	68 1659 1718, 0.5 HR FROM START OF CYCLE 0	DURATION (HR) 0.5 NO. OF CYCLES 3 hr; 1721, 0 hr ELECTRICAL POWER 500 W	(ON TIME / CYCLE
REQUIRED NAME	CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN	BLE _ OD (HE OR TAS TASK . LAG	SK NO. NO. TIME	Yes 16 CYCLE	68 1659 1718, 0.5 HR FROM START OF CYCLE 0	DURATION (HR) 0.5 NO. OF CYCLES 3 hr; 1721, 0 hr ELECTRICAL POWER 500 W 0 HR FROM START OF CYCLE	ON TIME / CYCLE
	CYCLE PERI PREDECESSOR SUCCESSOR AND INITIAL NO. OF MEN	BLE _ OD (HE OR TAS TASK . LAG	SK NO. NO. TIME	Yes 16 CYCLE	68 1659 1718, 0.5 HR FROM START OF CYCLE 0	DURATION (HR) 0.5 NO. OF CYCLES 3 hr; 1721, 0 hr ELECTRICAL POWER 500 W 0 HR FROM START OF CYCLE	ON TIME / CYCLE
TV System	INTERRUPTI CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1 1	BLE _ OD (HE OR TAS TASK . LAG	R) SK NO. NO. TIME	Yes 16 CYCLE	68 1659 1718, 0.5 HR FROM START OF CYCLE 0	DURATION (HR) 3 hr; 1721, 0 hr ELECTRICAL POWER 500 W O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING	ON TIME / CYCLE
	INTERRUPTI CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1 1	BLE _ OD (HE OR TAS TASK . LAG	R) SK NO. NO. TIME ID HR	Yes 16 CYCLE 0.5	68 1659 1718, 0.5 HR FROM START OF CYCLE 0 0	DURATION (HR) 3 hr; 1721, 0 hr ELECTRICAL POWER 500 W O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING	ON TIME / CYCLE
	INTERRUPTI CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1 1	BLE _ OD (HE OR TAS TASK . LAG	R) SK NO. NO. TIME ID HR	Yes 16 CYCLE 0.5	68 1659 1718, 0.5 HR FROM START OF CYCLE 0 0	DURATION (HR) 3 hr; 1721, 0 hr ELECTRICAL POWER 500 W O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING	ON TIME / CYCLE
	INTERRUPTI CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1 1	BLE _ OD (HE OR TAS TASK . LAG	R) SK NO. NO. TIME ID HR	Yes 16 CYCLE 0.5	68 1659 1718, 0.5 HR FROM START OF CYCLE 0 0	DURATION (HR) 3 hr; 1721, 0 hr ELECTRICAL POWER 500 W O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING	ON TIME / CYCLE
	INTERRUPTI CYCLE PERI PREDECESSOR AND INITIAL NO. OF MEN 1 1 1	BLE _ OD (HE OR TAS TASK . LAG	R) SK NO. NO. TIME ID HR	Yes 16 CYCLE 0.5	68 1659 1718, 0.5 HR FROM START OF CYCLE 0 0	DURATION (HR) 3 hr; 1721, 0 hr ELECTRICAL POWER 500 W O HR FROM START OF CYCLE SHIPPING WEIGHT O LB SHIPPING	ON TIME / CYCLE

TASK NO. 673 TITLE Determine Optimum Parameters for Sferics Detection

LEVEL Development Test

DESCRIPTION

Tests will be run using a standard radio receiver to determine the optimum frequency for reception of sferics (RF emissions caused by lightning). Since reception will probably be in the 100 mc/sec frequency, narrow beam directional antennas would have to be large, on the order of hundreds of feet in diameter. Therefore, various techniques will have to be investigated for location of lightning discharges, possibly involving optical techniques.

Other problems involve:

- 1. Lightning's RF signature characteristics determination -- power, envelope duration, pulse characteristics, etc.
- 2. Environmental noise -- terrestrial and extraterrestrial.
- 3. Propagation of the signal through the atmosphere and ionosphere.
- 4. The climatological aspects of the density of thunderstorms to be expected within the antenna pattern and the frequency of lightning strokes from a thunderstorm cell.

Sferics reception will have to be collated with ground observations of thunderstorm and lightning activity.

JUSTIFICATION

This task applies to a directional sferics receiver which is used to count, measure the strength of, and locate atmospheric electrical discharges. It will be necessary to conduct experimentation on various methods for locating and measuring lightning discharges.

NG:	673	··· <u>-</u> ·		TITLE	Determ	nine Optim	um Par	ameters	for Sfer	ics Det	ection
INTERRUPTIE						_ DURATION (H					
CYCLE PERIO	OD (HR)					NO. OF CYCL					
PREDECESSO	PREDECESSOR TASK NO.		None								
SUCCESSOR T	ASK NO.		1723,	2160 1	nr	-					
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1	62	1	0)		POWER 3			1	HR/	/CYCLE
					SHIPPING WE	IGHT <u>20</u>	LB	SHIPPI	NG VOLUME	1	FT ³
EQUIPMENT REQUIRED		D				NAME]	
			Camera Radio Re	eceive	r						
	L										